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TOMORROW'S MANPOWER NEEDS

National manpower projections and a guide
to their use as a tool in developing State
and area manpower projections

VOLUME I.
DEVELOPING AREA MANPOWER PROJECTIONS

BULLETIN NO. 1606

U.S. DEPARTMENT OF LABOR
BUREAU OF LABOR STATISTICS

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PREFACE

This is the first of four volumes of *Tomorrow's Manpower Needs,* a publication devoted to the subject of national, State and area projections of manpower requirements. The full series of volumes is as follows:

I Developing Area Manpower Projections

II National Trends and Outlook: Industry Employment and Occupational Structure

III National Trends and Outlook: Occupational Employment

IV The National Industry-Occupational Matrix and Other Manpower Data

The objective of this publication is to help fill a gap in manpower information best described by President Johnson in his 1964 Manpower Report to Congress, "Projections of probable need in particular occupations are an essential guide for education, training, and other policies aimed at developing the right skills at the right time in the right place." Projections of occupational needs at the State and area levels are needed in planning education and training programs. To help meet this need, *Tomorrow's Manpower Needs* presents up-to-date national manpower projections and provides a guide to their use in developing State and area manpower projections. This publication will be used in conjunction with a companion publication, *Handbook for Projecting Employment by Occupation for States and Major Areas,* prepared by the Bureau of Employment Security, Manpower Administration, U.S. Department of Labor, which will provide detailed operating instructions for the specific use of State employment security agencies.

The assumptions underlying this publication are: (1) State and area manpower requirements estimates can be made more reliable if the analyses are made within the context of nationwide economic and technological developments. (2) Regional manpower analysts familiar with local markets, the movement of industry into an area, and other factors affecting local industry and occupational employment are best able to estimate manpower requirements at the local level. (3) Selection of an appropriate projection technique or mix of techniques should take into account the financial resources available to the regional manpower analysts, the technical sophistication of their staff, the volume of projections required, the purpose of the projections as they affect the need for accuracy and detail, and the availability of computer assistance.

The Bureau of Labor Statistics hopes that by providing a consistent and reasonably detailed national manpower framework and a guide to its use in making State and area manpower projections the well-informed local analyst will be aided in developing or improving local manpower projections.

This report was prepared in the Bureau of Labor Statistics' Office of Manpower and Employment Statistics. The study was performed by staff of the Bureau's Division of Manpower and Occupational Outlook. It was planned and supervised by Sol Swerdloff

and Russell B. Flanders. Richard E. Dempsey, David P. Lafayette, James W. Longley, Neal H. Rosenthal, and Joe L. Russell prepared or supervised preparation of major parts of the study. Other staff members contributing to the research and writing were Liguori O'Donnell, Melvin Fountain, Gerard Smith, Michael Crowley, Lloyd David, Penny Friedman, Edward Ghearing, William Hahn, Jerry Kursban, Annie Lefkowitz, Dorothy Orr, Judson Parker, Irving Phillips, Joseph Rooney, Norman Root, John Sprague, Howard Stambler, and Annie Asensio.

The industry-occupational matrices for 1960 and 1975 were developed in the Division of Occupational Employment Statistics, under the direction of Harry Greenspan. The Office of Manpower Research of the Manpower Administration, U.S. Department of Labor, funded a large part of the development of the national industry-occupational matrix for 1975. The projections of the labor force were prepared by Sophia Cooper Travis, Chief, Division of Labor Force Studies and by Denis F. Johnston of that Division. The illustrative labor force projections by State presented in the appendix were reprinted from Special Labor Force Report No. 74, prepared by Denis F. Johnston and George F. Methee of that Division. Information on trends in output per man-hour was provided by the Office of Productivity, Technology, and Growth. Especially valuable was information on technological trends in major industries collected by that office under the direction of Edgar Weinberg. In the projections of employment by industry, extensive use was made of the work on estimates of industrial output and employment carried on by the Division of Economic Growth, as part of the Interagency Growth Study Project.

The Bureau wishes to acknowledge the encouragement received from the Coordinating Committee on Manpower Research (CCMR) of the U.S. Department of Labor, which recommended the development of this report. We also appreciate the assistance of many representatives of other Federal agencies, State government agencies, private research organizations, trade associations, labor unions, and colleges and universities.

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INTRODUCTION

In a growing economy, the occupational composition of the work force, as well as the skills required in each occupation, change through the years. Present manpower needs, therefore, are an uncertain guide to future requirements. To plan education and training programs to meet tomorrow's manpower needs, projections are needed of these changing manpower requirements. Such projections can help also in the vocational guidance of young people. To the extent that education, training, and vocational guidance accurately reflect the changing character of manpower needs, imbalances between manpower requirements and labor supply can be reduced, the productivity of the economy and the earning power of workers enhanced, and structural unemployment minimized.

The manpower legislation passed in the early 1960's emphasized the need for projections of occupational requirements and supply information. The Area Redevelopment Act of 1961, the Manpower Development and Training Act of 1962, the Vocational Education Act of 1963, and the Higher Education Facilities Act of 1963 were concerned with the education and training needs of the Nation. Some of these acts specifically provided that occupational needs should be one of the factors on which education and training programs should be based. Other legislation, such as the Economic Opportunity Act of 1964, the Civil Rights Act of 1964, the Higher Education Act of 1965, and the Appalachian Regional Development Act of 1965, focused additional attention on the need for up-to-date information on future skill requirements.

Tomorrow's Manpower Needs is an attempt to provide a basis for developing manpower requirements information for States and areas through the use of national manpower information. The report presents the latest projections of national manpower requirements and provides a guide to their use in developing State and area manpower projections. The Bureau hopes that this information will be useful also in planning national programs of education and training, and in reviewing the extent to which State and local programs are meeting the Nation's manpower needs. Specifically, the publication provides information on the impact of national developments on industry and occupational manpower requirements. It presents the results of research on the growth and changing composition of the population and the labor force, the relative growth of industries, the effect of automation and other technological changes and economic factors on industry employment, the occupational structure of industries, patterns of working life, and techniques for appraising the supply of workers having various skills. This information is provided to serve as a background and tool for the appraisal of manpower requirements at the State and local level.

The bulletin reflects the continuing program of manpower research conducted by the Bureau of Labor Statistics. Consequently, the projections of industry and occupational employment requirements supersede those published in previous Bureau reports. In addition, some of the projection data never have been published before by the Bureau in the detail presented in this report. It is anticipated that *Tomorrow's Manpower Needs* will be revised every few years to reflect the latest information available as a result of the Bureau's continuing program of manpower research.

The Bureau of Employment Security currently is preparing a companion volume, *Handbook for Projecting Employment by Occupation for States and Major Areas,* which will explain in additional detail how analysts in State employment security agencies can use various methods and sources of data, including the national manpower information presented in this report, to develop State and area manpower estimates and projections.

Chapter 1 of this volume is mainly concerned with techniques for using national employment trends and projections as a tool for developing estimates of State and area manpower needs. Methods are presented for relating local industry employment trends to national industry trends and projections to estimate future industry employment requirements at the local level. Similarly, methods are discussed for utilizing national occupational patterns of industries–current and projected–to develop current and future occupational estimates at the State and area level. Also presented in this chapter is a description of how one State used projections of national industry employment and occupational patterns in developing manpower requirements for that State and for metropolitan areas within the State. This chapter also includes a review of several recent reports that describe techniques which have been used to make local manpower projections.

Chapter 2 presents information and methods for estimating occupational replacement needs resulting from deaths and retirements.

Chapter 3 discusses several approaches to appraising the adequacy of supply in individual occupations.

The appendices to this volume present: projections to 1970 and 1980 of the population and labor force for States and regions, by age and color; and estimated national death and retirement rates for employed workers in 175 occupational classifications, by sex.

The Bureau of Labor Statistics, as its resources permit, may be able to provide technical assistance, including clarification of the methods described in this volume, to organizations developing State and area manpower projections. Requests for such assistance should be made to the appropriate BLS Regional Office, located as follows:

REGION I
1603-A Federal Building
Government Center
Boston, Mass. 02203
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Maine
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TOMORROW'S MANPOWER NEEDS Volume I.

USING NATIONAL MANPOWER DATA TO DEVELOP STATE AND AREA MANPOWER PROJECTIONS

The purpose of this chapter is to suggest ways that the information in this report may be of assistance to analysts in developing State and area manpower projections. The chapter was prepared on the assumption that area manpower projections can be developed more adequately if the analyses are made within the context of nationwide economic, technological, and demographic developments.

Volumes II and III of this report discuss changing markets, technological developments, and other factors expected to influence industry and occupational requirements through the mid-1970's. This information can be helpful in evaluating the reasonableness of local industry and occupational projections. For example, projections made of a rapid increase in industry employment in an area may be questioned if, at the national level, the same industry is projected to grow at a significantly different rate, or even to decline. However, analysts may be able to justify the different rates of growth on the basis of knowledge about local markets, the movement of industry into an area, or other factors affecting the local industry's employment. Similarly, a projected substantial rise in employment in an occupation in an area may be questioned in the light of a projected decline in employment in the occupation nationally. Local analysts, however, also may be able to justify the difference in the occupational growth rates. For example, the industries that employ many workers in the occupation may be growing much more rapidly in the area than in the nation. Other factors that might account for the difference in the growth rate would be area and national variations in product mixes within industries and differences in the organization of production processes.

The data on the national occupational distribution of individual industries in volume IV, appendix G are potentially a major source of information for developing local occupational employment estimates for a base year. The national occupational patterns can be used along with available local industry employment data to derive estimates of area industry-occupational patterns. Obviously, staffing patterns developed from local data alone would be superior to national patterns for this purpose. However, national patterns can be useful when local data are not available, incomplete, or too aggregated. In some industries, such as restaurants, hotels, and banks, local occupational patterns may not differ significantly from national patterns. Therefore, by using national patterns for such industries, States and areas can concentrate their resources on the development of occupational structures for key or unique industries.

Most important, the national projections of industry and occupational employment can be used as tools to develop first approximations of future local industry and occupational employment. For example, in developing area projections of industry employment, local industry employment trends can be related to industry employment nationally, and trends in the area's share of national employment determined. An extrapolation of these trends, together with the national industry projections, can provide a first approximation of an industry's future employment in the area.

First approximations of employment by industry should be refined by area analysts who are familiar with the local economy and who can make use of local data[1] and other resources, particularly studies or information regarding the local economy developed by State government agencies and private research groups. The information obtained through contact with local employers might be especially helpful.

Labor force projections frequently are used as a control in developing industry and occupational projections. Persons who develop State and area projections may find useful the projections of population and labor force by State and area, 1970 and 1980, shown in appendix C of this volume.

The following paragraphs discuss some simple techniques for relating national and area employment trends to develop first approximations of area employment by industry. Following this discussion are explanations of some techniques for utilizing national occupational staffing patterns (industry-occupational matrix) to develop occupational projections for an area. The rest of the chapter relates an example of how national manpower projections and other data were used by New York State to develop industry and occupational projections. The last section also includes brief descriptions of several manpower studies that develop methods and project manpower characteristics.

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[1] Two directories of statistical sources are published by the Federal Government. They contain information on sources of Federal statistics for local areas. These directories are as follows:

Directory of Federal Statistics for Local Areas: 1967, A Guide to Sources, U.S. Department of Commerce, Bureau of the Census. Available from U.S. Government Printing Office, Washington, D.C. 20402–Price $2.25.

Guide to Industrial Statistics, 1964 edition, U.S. Department of Commerce, Bureau of the Census. Available from U.S. Government Printing Office, Washington, D.C. 20402–Price 40 cents.

Industry Projections

The future employment level of individual industries is a primary determinant of occupational requirements, because each industry has a unique occupational structure. To cite an elementary example, a sharp change in total employment in the construction industry will have a marked effect on the requirements for blue-collar workers–carpenters, electricians, laborers, etc. On the other hand, if employment in the insurance industry changes sharply, requirements for workers in white-collar occupations will be affected significantly. Consequently, estimating future employment in individual industries is a major step in developing occupational employment requirements[2].

A number of techniques can be used to develop State and area industry employment projections. In accordance with the assumptions underlying this publication, which were stated in full in the preface to this volume, the technique or mix of techniques selected by the regional manpower analysts should take into account factors such as the resources available for projections, including the size and technical sophistication of the staff; the volume of projections required; the purpose of the projections as they affect the need for accuracy and industry detail; and the availability of computer assistance. Several techniques are described in some detail below; each one has a different degree of acceptability in terms of economic theory and each one requires varying amounts of technical expertise.

Local employment in an industry can be compared over time with national employment in the same industry and a trend in the relationship can be determined by computing for each year the local industry employment as a percentage of the industry's employment nationally. Table 1 and Chart 1 illustrate this procedure using wage and salary employment in the

Table 1. Ratio of Pennsylvania State Employment to National Employment in the Furniture and Fixtures Industry 1947-66, and Projected 1975 1/

Year	Employment (In thousands)		Ratio
	National	State	
1947	336.0	19.8	5.9
1948	346.0	21.2	6.1
1949	317.0	18.1	5.7
1950	364.0	23.6	6.5
1951	357.0	20.9	5.9
1952	357.0	22.6	6.3
1953	370.0	24.7	6.7
1954	342.0	22.4	6.5
1955	364.0	23.9	6.6
1956	376.0	25.0	6.6
1957	374.0	25.2	6.7
1958	361.0	23.9	6.6
1959	385.0	24.4	6.3
1960	383.0	23.7	6.2
1961	368.0	22.6	6.1
1962	385.0	22.6	5.9
1963	390.0	23.6	6.1
1964	406.0	24.7	6.1
1965	431.0	26.2	6.1
1966	462.0	27.8	6.0
1975 (projected)	510.0	30.1	5.9

1/ Wage and salary workers only.

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[2] For a number of occupations, however, employment estimates can be developed directly. (See the national techniques in appendix A to Volume IV for a discussion.)

furniture and fixtures industry (SIC 25) for the Nation and the State of Pennsylvania, for the years 1947 through 1966.[3] Wage and salary employment in the industry in the State can be projected by extrapolating these relationships. The simplest way to extrapolate the trends is to compute (or draw) a line of average relationship, trend line, through the plotted historical data and extend it to the target year. Chart 1 shows the line of relationship extrapolated to 1975. The percentage derived for the target year, 5.9, then can be multiplied by the national projection of wage and salary employment in the furniture and fixtures industry (510,000),[4] to derive a first approximation of wage and salary employment in the industry[5] for the State of Pennsylvania in the target year (about 30,100).

This technique may provide particularly good results for industries that sell their products in a nationwide market, as do most manufacturing and mining industries and some industries in other divisions. For example, if employment in basic steel is growing in the economy, steel plants across the country usually will be increasing employment. However, industries such as retail trade and automobile repair services that sell in local markets are generally more responsive to local trends in factors such as population and income and, therefore, may not provide as good results when the ratio method is used.[6]

In many industries area and national employment trends may not show a close relationship. This statement may be true for industries with different product mixes at the local and national level or because of locational shifts of industries caused by, for example, changes in the regional size of markets, the input-output relationships between industries, and the relative prices of labor and materials in different regions. Regression techniques may be used to take account of growth factors originating within an area. Chart 2 illustrates the results of using multiple regression techniques to explain employment in an industry strongly influenced by regional demand. The form of the equation used was $y = a + bx_1 + cx_2$, where y represents retail trade employment in Illinois, x_1 represents population in Illinois, and x_2 represents per capita change in personal income in Illinois. When regression techniques are used, the independent variables chosen must be ones for which projections will be available or can be made, i.e., in the present illustration, a projection of retail trade employment in Illinois can be made from the regression equation only if both population and per capita personal income have been projected.

Regression techniques also may be used to take account of factors which influence employment in an industry locally, in addition to those which effect the industry nationally. For example, logarithmic or linear regression could be used with area industry employment as the dependent variable (y), and national industry employment (bx_1) and time (cx_2) as independent variables. In this approach national employment may represent overall nationwide demand for the products of the industry adjusted to allow for changes in productivity of labor, and time would account for the affect of all other factors directly influencing industry employment in a particular region. The technique used by New York State to project industry employment, as described below, was similar to this approach.

Occupational Projections

The following paragraphs describe how the national industry-occupational matrix can be used to develop initial occupational patterns and/or projections for a

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[3] National and State totals of employment by industry used in this and the following example are limited to wage and salary workers. Data are from *Employment and Earnings Statistics for States and Areas,* Bulletin 1370-4, issued July 1967, and *Employment and Earnings Statistics for the United States,* Bulletin 1312-5, issued October 1967, both published by the U.S. Department of Labor, Bureau of Labor Statistics.

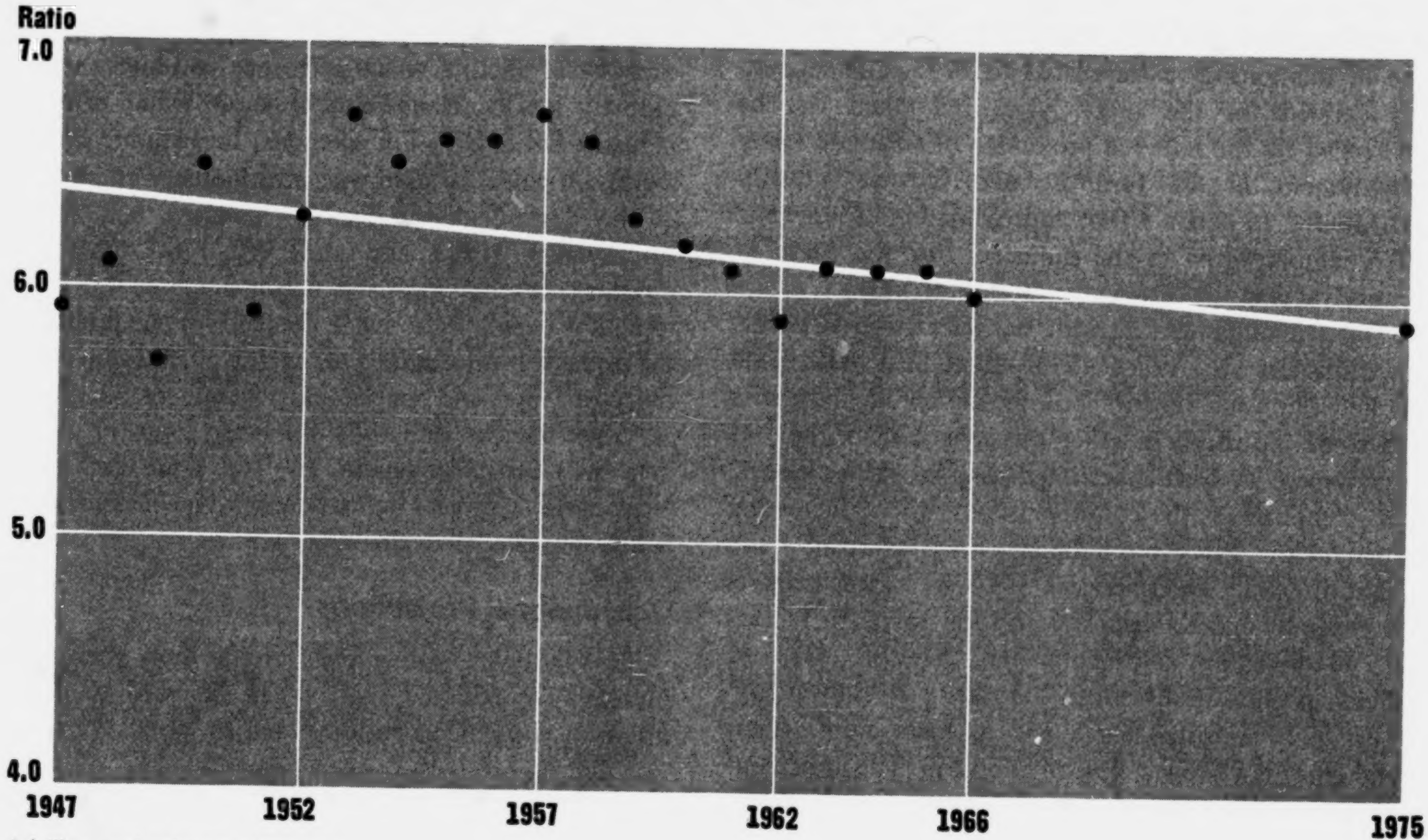
[4] See volume IV, appendix B for projections to 1975 of wage and salary workers, by industry.

[5] Techniques for developing total employment estimates from wage and salary estimates are discussed on p. of this volume.

[6] A tendency exists also for area and national employment trends in industries that sell in local markets to move in a consistent and measurable relationship over time. The following are several reasons for this fact: (1) The area is a part of the Nation and area industry employment changes are reflected in the national industry employment levels; (2) the pattern of demand for the products of local industries is affected greatly by population and income in the region which, in turn, are influenced by basic social and economic trends which affect the whole Nation. Generally, if population and income are rising rapidly in the Nation, they also are rising rapidly in *most* sections of the country, and providing income to people for purchasing many of the products and services of local market industries; (3) a great amount of homogeneity exists across the U.S. The tastes and preferences of the people of Lincoln, Nebraska probably are very similar to those of the people of Boston, Massachusetts. Limited by technology and social customs, the population of both these cities own televisions, automobiles, and houses, and, therefore, require the services of TV repair and automobile repair firms, and plumbing and painting contractors. They purchase local newspapers, telephone friends, listen to local radio and TV, eat doughnuts and drink soda pop, support local printing and publishing, advertising, communications, and baking and beverage industries. Local businesses in all areas of the country require the services of auditing, banking, printing, and management consulting firms; and the technology and the structure of industries, among other factors, are similar throughout the country. As a result, price structures for the products of local market industries are similar.

Chart 1.

FURNITURE AND FIXTURES INDUSTRY RATIO OF EMPLOYMENT[1] STATE OF PENNSYLVANIA AND THE NATION, 1947-66, AND PROJECTED, 1975



1/ Wage and salary workers only.

State or area. The methods discussed by no means exhaust all the possible ways the national estimates may be used. The data are not suited for use by all States and areas.

The industry-occupational matrix is a set of occupational patterns of industries representing the entire economy. (An occupational pattern for an industry is the percent distribution of occupational employment in that industry.) The national matrix presented in this report covers 116 industries and 162 occupations.

Use of the National Industry-Occupational Matrix System.[7] As has been indicated previously, the future employment level of individual industries is a primary determinant of occupational requirements because of each industry's unique occupational structure. The second factor influencing the trend in occupational employment is the changing occupational distribution of employment within industries. The application of new technology, changes in establishment size, the development of new products, etc., are occurring constantly within an industry. All these factors spur growth in the relative requirements for some occupations, and at the same time reduce the relative need for others. Basically, occupational projections developed through the industry-occupational matrix system involve the use of the two primary variables mentioned above—projections of employment, by industry, and projections of the occupational structure of each industry. When the occupational patterns of an industry in the target year are applied to projected industry employment estimates, an approximation of employment requirements for each

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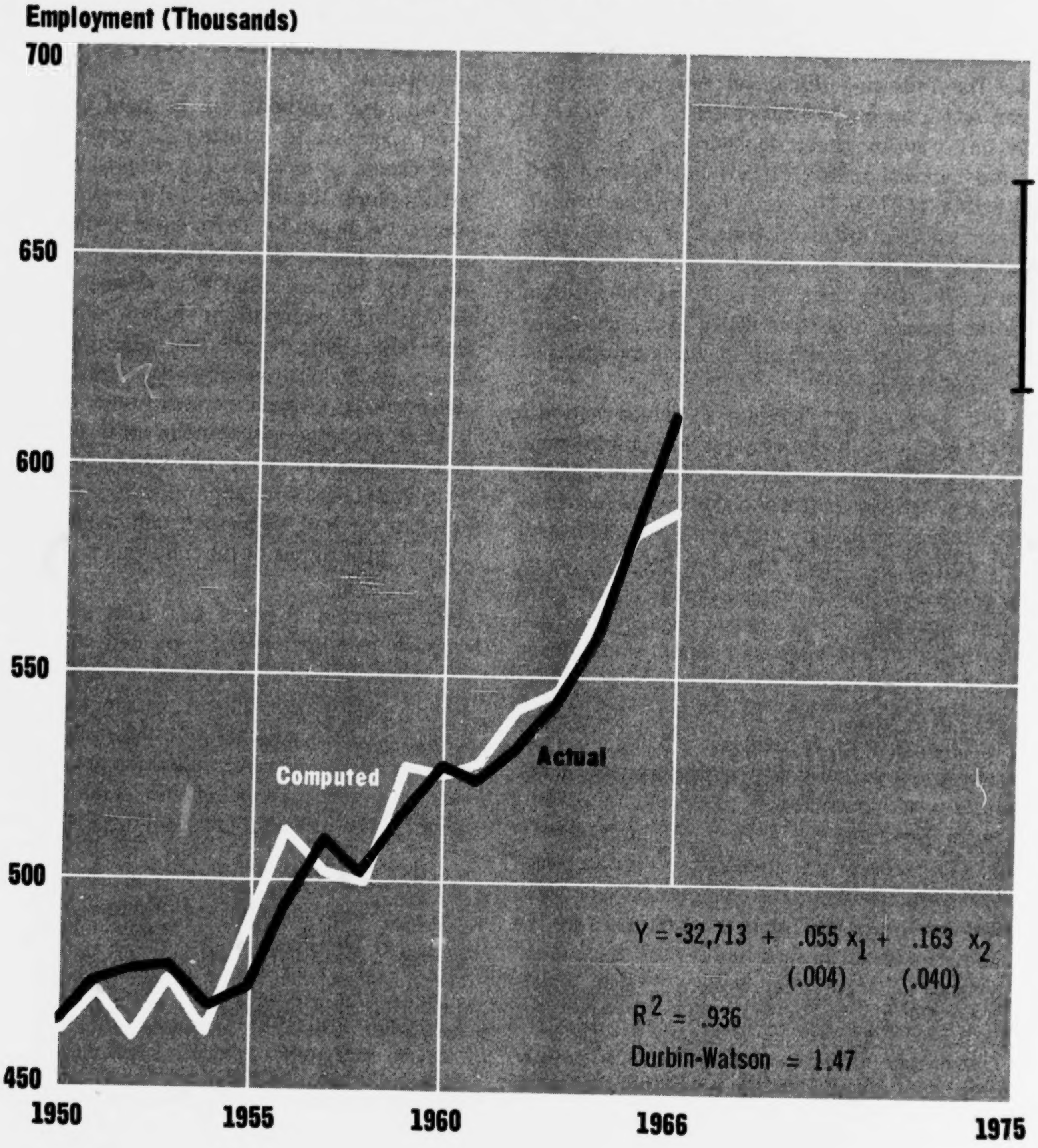
[7] Vol. IV, appendix G of this report contains the 1960 and 1975 national industry-occupational matrices. Volume II discusses the factors that are expected to effect the occupational distribution of individual industries. Vol. IV, appendix A provides a description of the methods used to develop and project the national matrix.

Chart 2.

EMPLOYMENT[1] RETAIL TRADE, STATE OF ILLINOIS, 1950-66, AND PROJECTED RANGE[2] 1975



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[1] Wage and salary workers only.

[2] Employment range computed from the equation based upon high-low U.S. Bureau of Census Population projections for Illinois (11,879,000-11,395,000) and high-low changes in Personal Income per capita for Illinois 1962-66 ($242-$89). See U.S. Department of Commerce, Population Estimates, Series P-25, No. 375, October 3, 1967, and Survey of Current Business, Vol. 47, No. 8, Aug. 1967.

of the occupations in the matrix is derived. By following this procedure for each industry and summing the results, estimates of total requirements for each occupation can be obtained.

The development of State and area occupational projections through the use of the national industry-occupational matrices is possible through a variety of methods. The following discussion is limited to two techniques which appear to offer promise.[8] The first is a relatively simple system that is dependent upon both the base period national matrix (1960) and the projected national matrix (1975). The second technique is more complex; it requires the development of an area base period (1960) matrix. An area matrix then may be projected to the target year by applying the national trends in the occupational structure of each industry to the occupational structure of corresponding industries in the area base period matrix.

The first step of any method in which national matrices are used is to make area industry employment estimates consistent with the total employment concept on which the national industry-occupational matrix is based. Private wage and salary employment, by industry, must be modified to include the other three classes of workers, i.e., self-employed, unpaid family workers, and government[9] workers. Additional refinements also should be made to the wage and salary employment estimates. The first involves an adjustment to a one-person one-job concept, which can be made by deducting the secondary jobs of multiple job holders. The second refinement accounts for persons employed but not at work (unpaid absences).[10]

The table presented in volume IV, appendix D illustrates the proportion, nationally, of private wage and salary workers to total employment for each industry. Private wage and salary workers make up the largest share of workers in most industries. As is shown, the importance of the "other workers" varies widely among the industries. Self-employed and unpaid family workers are especially important in industries such as agriculture; several service industries, including legal, engineering, and medical services; retail trade; and construction. Government workers make up a significant part of the work force in industries such as educational services, local public utilities, hospitals, shipbuilding, and construction.

Two basic methods can be used by the area manpower specialist to estimate the employment of these three classes of workers. The simplest technique would be to adopt the national relationships as shown in volume IV, appendix D for both 1960 and 1975. This technique might prove satisfactory for industries in which the workers other than wage and salary workers are relatively unimportant, but in others, particularly those where large numbers of government workers are concentrated, local analysts may want to develop their own estimates through the use of other data.[11]

Once area industry employment estimates on the total employment concept have been developed for both 1960 and 1975, first approximations of projected area occupational employment requirements may then be derived through one of the following methods.

Area Projection Method A.[12] This technique uses the national base period and projected matrices, and does not require a special area matrix. In general, estimates of area occupational requirements are made by applying 1960 and 1975 national industry-occupational patterns to their appropriate area industry employment estimates for each year; summing the resulting occupational employment to area totals; computing the 1960 to 1975 change factors (percent change) for each occupation; and applying the change factors to *separately* estimated 1960 area occupational employment totals. The individual steps involved are:

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[8] A third method, somewhat different than either of these, was followed by New York State and is described later in this chapter.

[9] Government workers involved in activities unique to government are classified in the public administration industry. Government workers in agencies engaged in activities also carried on by private enterprises, such as education and medical services, construction, transportation, and manufacturing, are classified in their appropriate industry category, regardless of whether they are paid from private or public funds.

[10] For information on multiple job holders and unpaid absences, see the *Handbook of Labor Statistics 1967,* U.S. Department of Labor, Bureau of Labor Statistics. For sale by the U.S. Government Printing Office, Washington, D.C., 20402, Price $2.

[11] Industry employment is reported separately for each class of worker in 1950 U.S. Census of Population, Vol. II, *Characteristics of the Population,* Table No. 83, and *1960 U.S. Census of Population, Vol. I, Characteristics of the Population,* Table No. 129, U.S. Department of Commerce, U.S. Bureau of the Census. These data are available for all States and for Standard Metropolitan Statistical Areas that have a population of over 250,000. The Population Census data should provide a basis for estimating employment levels for self-employed, unpaid family, and government workers, and for determining the trend in employment of these workers by industry. Additional information on employment of government workers also is available from the *Census of Government, 1966, Vol. III, Compendium of Public Employment,* and the annual reports on *State Distribution of Public Employment,* published by the Bureau of the Census. Information on self-employed workers in selected industries is available from the 1963 and earlier editions of the Census of Business and the Census of Manufacturers, also published by the Bureau of the Census.

[12] See footnote 17 for a mathematical expression of Method A.

a. The 1960 national industry-occupational patterns are applied to their respective 1960 area industry employment estimates. The resulting occupational employment is then summed to area totals. This same procedure is followed using the 1975 national industry-occupational patterns and projected area industry employment estimates. In table 2, this step is illustrated in column 3 (1960) and column 6 (1975). In this example, the two aggregates were 42,660 for 1960 and 57,921 for 1975.

b. The 1960-75 change factor for the occupations then must be computed by dividing the 1975 employment aggregate by the 1960 employment aggregate developed in step "a". In table 2, the resulting change factor for automobile mechanics and repairmen was $\frac{57{,}921}{42{,}660}$ or 1.358.

c. Base period (1960) area employment estimates must be made for each occupation for which projections are desired. The 1960 Census[13] can supply the basic data needed for these estimates.[14] (Other data sources should be investigated and utilized, if available.)[15] For illustrative purposes, the base period (1960) employment of automobile mechanics and repairmen in State Z was reported[16] to be 43,800 workers. This number is somewhat higher than the 1960 employment computed in step "b". Such differences should be expected, since the patterns used in step "b" are national averages. The differences in the estimates developed in steps b. and c. point out that in one or more industries a higher proportion of automobile mechanics and repairmen are employed in State Z than the national average.

d. The initial 1975 employment estimate of automobile mechanics and repairmen then may be computed by applying the change factor to the base period area employment determined in step "c". By applying the change factor in table 2, the estimated 1975 employment for automobile mechanics and repairmen in State Z is calculated to be 59,480:

Occupational Trend Factor (1.358) x Base Period Occupation Employment (43,800)	=	1975 Employment of Automobile Mechanics and Repairmen in State Z
1.358 x 43,800	=	59,480

The above procedure must be repeated for each occupation for which projections are desired. When this procedure is used, local projections are possible for each occupation and occupation group included in the national matrices.

Area Projection Method B.[17] Method B integrates national industry-occupational structure trends with a specially developed area base period matrix. In order to use method B, an area base period industry-occupational matrix must be developed independently. Then, an area target year (1975) matrix is computed by applying the changes, 1960-75, projected for the industry-occupational structures at the national level to the corresponding industries in the area base period, 1960, matrix. Initial 1975 area occupational employment estimates then can be made by applying the 1975 area

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[13] *1960 Census of Population,* Vol. I, Characteristics of the Population, Parts 1-50, tables 74, 84, and 121, U.S. Department of Commerce, Bureau of the Census.

[14] The U.S. Census of Population is the major source of detailed occupational employment statistics. Users of these data should be aware of their limitations, such as general undercount, possible response errors, classification problems, etc. For a more thorough evaluation of the Census occupational employment data see *Occupational Employment Statistics, Sources and Data,* BLS Report 305, or *Evaluation and Research Program of the U.S. Census of Population and Housing 1960: The Employer Record Check,* Series ER60, No. 6. U.S. Department of Commerce, Bureau of the Census.

[15] See, for example, *Occupational Employment Statistics, Sources and Data,* U.S. Department of Labor, Bureau of Labor Statistics, BLS Report 305.

[16] The reported 43,800 workers in 1960 may have come from such sources as the Census of Population 1960 or an Area Skill Survey for that year.

[17] A mathematical formula for methods A and B follows:

Method A

$$L_j(75) = \frac{\sum_{i=1}^{n} f_{ij}(75)\ L_i(75)}{\sum_{i=1}^{n} f_{ij}(60)\ L_i(60)} \cdot L_j(60)$$

Method B

$$L_j(75) = \sum_{i=1}^{n} L_{ij}^{*}(75) \cdot L_i(75)$$

where

$$L_{ij}^{*}(75) = \frac{f_{ij}(75)}{f_{ij}(60)} \cdot L_{ij}^{*}(60)$$

L_{ij}	(year) is local employment by industry i and occupation j in the given year.
L_i	(year) is total local employment in industry i in the given year.
f_{ij}	(year) is national fraction of occupation j in industry i in the given year.
L_{ij}^{*}	(year) is local fraction of occupation j in industry i in given year.
L_j	(year) is total local employment in occupation j.

Table 2. Method A--Development of Area Employment Trend Factor for Automobile Mechanics and Repairmen in State Z Using National Matrices

Industry	1960 State Z total industry employment (1)	1960 national ratio 1/ of automobile mechanics to total employment (percent) (2)	Column 1 X Column 2 (3)	1975 estimated State Z total industry employment (4)	1975 national ratio 1/ of automobile mechanics of total employment (percent) (5)	Column 4 X Column 5 (6)	1960-75 area change factor for automobile mechanics (total column 6) ÷ (total column 3) (7)
Motor vehicle and equipment manufacturing	377,200	3.77	14,220	408,000	3.07	12,526	
Local and interurban transit, except taxis	8,500	6.96	592	8,000	5.29	423	
Trucking	35,900	3.37	1,210	45,000	4.15	1,868	
Motor vehicle and equipment (wholesale)	6,000	1.72	103	10,000	1.74	174	
Automobile and accessory dealers (retail)	35,200	27.31	9,613	54,000	29.64	16,006	
Gas stations	28,300	8.83	2,499	44,000	12.49	5,496	
Automobile repair services	20,400	55.47	11,316	37,000	47.85	17,705	
All other (109) industries	3,179,500	(2)	2/3,107	4,174,000	(2)	2/3,723	
Total 116 industries			42,660			57,921	1.358

1/ Available in Volume IV, appendix G.
2/ Each of the 109 industry estimates were computed separately. They are combined here because of space limitations.

occupational-industry patterns to projected area industry employment and aggregating the results to area occupational totals. The individual steps involved are as follows:

a. An area occupational-industry matrix for the base period must be developed. (Occupation-industry profiles, for example, are available for all areas that have over 250,000 population, from the 1960 Census of Population.)[18] Table 3, column 4 illustrates a State pattern for a single industry (construction) derived from the 1960 Census.

b. The 1960-75 occupation change factors must be computed for each cell in the national matrices by dividing each 1975 occupational ratio by its corresponding 1960 occupational ratio $\frac{\text{(1975 National Matrix Cell).}}{\text{(1960 National Matrix Cell).}}$ In table 3, column 3 shows this step for each occupation in the construction industry.

In this instance, the resulting trend factor for civil engineers is $\frac{2.39\ (1975)}{1.86\ (1960)}$, or 1.284.

Appendixes I and J of volume IV provide the national occupational change factors discussed above. Appendix I includes the factors directly matching the industry and occupational data published in the decennial census, which is available to States and areas. Appendix J provides change factors for a more detailed set of industries, so States and areas may select change factors most appropriate to their needs. For example, in appendix I, the "other nondurable goods" sector includes petroleum refining, rubber products and leather products industries. If an area's employment is largely concentrated in petroleum refining, the area analysts may wish to select the change factors from appendix J representing petroleum refining rather than the more aggregated category of "other nondurable goods."

c. The 1975 area matrix is computed by applying the derived national occupation change factors to the corresponding cell in the area base period (1960) matrix. Table 3, column 5, illustrates this step as follows for civil engineers:

National trend factor x 1960 area ratio = 1975 area ratio

1.284 x 2.15% = 2.76%

This procedure is repeated for all occupations in an industry and the resulting occupational ratios summed to industry totals and forced, on a prorated basis, to 100 percent.

d. In order to forecast State Z's total requirements for an occupation, steps b and c must be completed for each industry and the resulting occupational ratios for the projected year for each industry applied to the separately projected area industry employment estimates. (See Table 3, column 6. In this illustration, the employment requirements in the construction industry in State Z were projected to be 275,000 in 1975.)

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[18] *1960 Census of Population*, vol. I, *Characteristics of the Population*, table No. 125, U.S. Department of Commerce, Bureau of the Census a special tabulation providing further industry and occupational detail has been obtained from the U.S. Bureau of the Census by some States for a fee. See also *Occupational Employment Statistics, Sources and Data*, U.S. Department of Labor, Bureau of Labor Statistics, BLS Report 305, for other sources of occupational data.

The resulting occupational estimate for each industry can then be aggregated to obtain the area's total employment requirements for the occupation in the target year.

Occupational projections developed through the use of relatively mechanical systems such as those discussed in the preceding paragraphs, should be viewed only as first approximations. They do, however, provide the local manpower analyst a base upon which to begin his evaluation. Method A seems to offer the best balance between the systems input requirements and the quality and quantity of projections produced. Its relative simplicity and adaptability to smaller areas makes it especially attractive. Method B is a more complex approach. The development of the special area matrix required by this technique could prove to be a difficult and resource consuming task. Furthermore, the projections might prove less desirable, if data limitations forced the creation of an area matrix with considerably less industry detail than that available at the national level. The occupational structures of detailed industries are sometimes significantly different than that of the industry group of which they are a part. On the other hand, an area matrix with relatively detailed industry base, such as that which may be obtained from a special Census tabulation, would have many advantages. For example, it would provide the area analyst a tool to develop current occupational employment estimates by utilizing the base period occupational structure, on the assumption that occupational patterns do not change significantly in the short run, or by adjusting the base period structure on the basis of new data.

The use of the national matrices also offers the prospect of preparing a range of occupational projections based on differing assumptions of an area's future economic conditions by developing alternative projections of industry employment or by modifying the changes expected in the occupational structure of an area's key industries. Such flexibility may prove especially valuable in States and areas where the industrial structure is changing rapidly and where future levels of industry employment depend greatly on factors such as defense expenditures, which are difficult to predict.

The growth in employment requirements for each occupation determined through the methods discussed above or similar methods are but a first step in estimating the overall occupational requirements in the projected period. To the growth estimates must be added replacement needs expected as a result of deaths, retirements, and transfers of experienced workers to other occupations. Several methods for estimating such openings are discussed in the following chapter.

Test of Method A. A test of occupational projection method A was made to provide a basis for evaluating its accuracy. A less complex method (A^1) also was tested to determine whether more accurate projections were attained by "localization" of the national matrix (steps c and d, page) in method A. Test method A^1 was based on the assumption that an area's industry-occupational *patterns,* in addition to its *trends* (method A), are the same as national industry-occupational patterns in the base and projected years.

The test of the technique was limited, because it was performed for one State and focused on the accuracy of method A only. It assumed that industry employment projections for Ohio made in 1950 for 1960 were perfect. It further assumed that projections of national industry-occupational patterns made in 1950 for 1960 also were perfect. In reality, error would be involved in each of these steps, in addition to the error associated with the collection of the basic data.

Data on 40 occupations for the nation and the State of Ohio in 1950 and 1960 were used in the test. National industry-occupational patterns for 1950 and 1960[19] were applied to detailed industry employment totals for Ohio in 1950 and 1960[20], respectively. Preliminary 1950 and 1960 estimates of occupational employment in Ohio were derived by summing employment in each of the 40 occupations across all industries. Final projections (method A) were made by deriving a coefficient of occupational change for each occupation between 1950 and 1960, and applying it to the respective occupational totals for 1950, as shown in the Census of Population, 1960, for Ohio. For method A^1, the preliminary projections based solely on national industry-occupational patterns and trends were considered the final projections.

Table 4 presents the results of the test of projection method A, shown as a percent of actual occupational employment in Ohio in 1960. Of the 31 detailed occupations in the test of method A, 18 were projected between 105 and 95 percent of actual employment in 1960, and 27 between 110 and 90 percent. Differences in industry product mix in Ohio and the nation were important determinants of those projections that were significantly in error. For example, the projection of

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[19] Derived from data in the *U.S. Census of Population: 1960, Occupation by Industry,* Final Report PC(92)-7C. U.S. Department of Commerce, Bureau of the Census 1963.

[20] *U.S. Census of Population: 1960, Detailed Characteristics, Ohio, Final Report* PC(1)-37D. U.S. Department of Commerce, Bureau of the Census.

Table 3. Method B--Projecting Employment Requirements in the Construction Industry, 1/ by Occupation, in State Z, Using National Matrix Trends

Occupation	National matrices 2/		1960-75 national change 3/ factors	Construction 4/ industry pattern, State Z 1960 (percent)	Derived 1975 construction industry pattern, State Z (percent)	Projected 1975 employment in construction industry State Z
	Construction industry pattern, 1960 (percent)	Construction industry pattern, 1975 (percent)				
	(1)	(2)	(3)	(4)	(5)	(6)
Total, all occupations----------	100.00	100.00		100.00	5/100.00	7/275,000
Professional, technical, and kindred workers-------------------	5.55	7.20	--	5.97	6/ 7.57	7/ 20,818
Accountants and auditors----------	.27	.38	1.409	.34	.48	1,320
Architects------------------------	.03	.03	1.034	.05	.05	138
Chemists and natural scientists----	.04	.04	.992	.02	.02	55
Designers and draftsmen-----------	.73	.86	1.165	.80	.93	2,558
Engineers, civil------------------	1.86	2.39	1.284	2.15	2.76	7,590
Engineers, electrical-------------	.06	.07	1.070	.10	.11	303
Engineers, industrial-------------	.02	.02	1.084	.03	.03	83
Engineers, mechanical-------------	.09	.10	1.046	.10	.10	275
Engineers, other technical--------	.08	.09	1.139	.14	.16	440
Lawyers and judges----------------	.03	.03	.918	.03	.03	83
Personnel and labor ralations workers------------------------	.03	.06	2.362	.01	.02	55
Surveyors-------------------------	.33	.52	1.571	.23	.36	990
Other technicians, except medical and dental----------------------	1.27	1.70	1.342	.90	1.21	3,328
Other professional, technical, and kindred workers-----------------	.71	.91	1.282	1.02	1.31	3,603
Managers, officials, and proprietors	11.59	11.29	.974	10.30	10.02	27,555
Clerical and kindred workers--------	4.31	6.05	--	4.23	6/ 5.91	7/ 16,253
Bookkeepers-----------------------	1.19	1.52	1.274	1.04	1.32	3,630
Office machine operators----------	.04	.08	1.880	.03	.06	165
Stenographers, typists and secretaries-------------------	1.26	1.79	1.421	1.36	1.93	5,308
Telephone operators---------------	.04	.04	1.021	.06	.06	165
Shipping and receiving clerks------	.02	.01	.439	.04	.02	55
Other clerical workers------------	1.76	2.61	1.483	1.70	2.52	6,930
Sales workers---------------------	.30	.37	1.224	.40	.49	1,348
Craftsmen, foremen, and kindred workers--------------------------	51.80	48.96	--	55.41	6/ 52.51	7/144,403
Blacksmiths, forgemen, and hammermen---------------------------	.03	.04	1.356	.04	.05	138
Boilermakers----------------------	.10	.13	1.348	.14	.19	523

Table 3. Method B--Projecting Employment Requirements in the Construction Industry, 1/ by Occupation, in State Z, Using National Matrix Trends--Continued

Occupation	National matrices 2/		1960-75 national change 3/ factors	Construction 4/ industry pattern, State Z 1960 (percent)	Derived 1975 construction industry pattern, State Z (percent)	Projected 1975 employment in construction industry State Z
	Construction industry pattern, 1960 (percent)	Construction industry pattern, 1975 (percent)				
	(1)	(2)	(3)	(4)	(5)	(6)
Cabinetmakers and pattern makers---	.16	.14	.924	.07	.06	165
Carpenters------------------------	16.14	11.89	.737	16.40	12.07	33,193
Cranemen, derrickmen, and hoistmen-	.41	.55	1.347	.47	.63	1,733
Electricians----------------------	3.38	3.61	1.070	4.35	4.64	12,760
Foremen, not elsewhere classified--	2.23	3.12	1.401	2.09	2.93	8,058
Machinists and job setters---------	.07	.06	.800	.09	.07	193
Mechanics and repairmen------------	2.03	2.66	1.307	2.39	3.12	8,580
Millwrights-----------------------	.12	.19	1.568	.12	.19	523
Plumbers and pipefitters-----------	4.61	4.67	1.014	5.34	5.40	14,850
Tinsmiths, coppersmiths, and sheet metal workers------------------	.84	1.04	1.241	1.17	1.45	3,988
Other craftsmen-------------------	21.68	20.86	.962	22.61	21.71	59,703
Operatives and kindred workers------	7.86	11.78	--	7.04	6/ 10.67	7/ 29,343
Drivers (truck, etc.) and deliverymen----------------------------	3.57	4.60	1.290	2.93	3.78	10,395
Welders---------------------------	.76	1.20	1.580	.55	.87	2,393
Other operatives------------------	3.53	5.98	1.695	3.56	6.02	16,555
Service workers--------------------	.50	.52	--	.61	6/ .60	7/ 1,650
Charwomen, janitors, and porters---	.17	.27	1.535	.11	.17	468
Guards, watchmen, and doorkeepers--	.16	.09	.540	.11	.06	165
Other service workers-------------	.17	.16	.941	.39	.37	1,018
Laborers, except farm--------------	18.09	13.83	.764	16.04	12.23	33,633

1/ Construction industry includes wage and salary, self employed, and unpaid family workers employed in the contract construction industry (SIC 15-17). It also includes workers employed in government agencies engaged in construction activities such as highway maintenance, land reclamation, and water works. It does not include workers engaged in force account construction or maintenance in manufacturing, public utilities, and other industries.

2/ Available in Appendix B of this report. Occupations not shown separately are combined with appropriate residual categories.

3/ See Appendix I or J for national industry-occupational change factors.

4/ Derived from 1960 Census of Population, Characteristics of the Population, table 125, Industry Group of the Employed by Occupation, U.S. Department of Commerce, Bureau of the Census.

5/ After first computation, the derived 1975 pattern summed to 100.12 percent. Final pattern was then computed by forcing to 100.00 percent on a prorated basis.

6/ Sum of individual occupations in the major occupation group.

7/ Individual items may not add to total because of rounding.

electrical engineers was almost one/quarter higher than the actual level. The reason may be that industries in Ohio tend to have less research and development activity, which is concentrated regionally, than their counterparts nationally. Moreover, Ohio's plants classified in industries that employ high proportions of electrical engineers may tend to produce household appliances rather than technologically complex equipment such as defense and space communications systems. Either one of these situations could have accounted for the significant error in the projection of electrical engineers.

In the test of method A, better results were obtained for occupational groups than for detailed occupations. The fact that substitution of workers in detailed occupations is probably more prevalent than substitution between occupational groups was responsible for this result. Another conclusion from the tests was that the assumption underlying method A, that the trend in occupational usage in particular industries at the area level follows industry-occupational trends nationally, appears to be substantially correct. The test also pointed out that the level of industry usage of occupations can differ significantly between an area and the nation. This

Table 4. Projections of Selected Occupations Using Method A, State of Ohio, as Percent of Actual Employment in the Projected Year

Occupation	Percent
Professional, technical, and kindred	102
Chemists	94
Draftsmen	106
Engineers, electrical	123
Nurses, professional	102
Technicians, medical and dental	99
Managers, officials, and proprietors	101
Clerical and kindred	100
Bank tellers	92
Cashiers	104
Office machine operators	111
Secretaries, stenographers, and typists	93
Sales workers	99
Craftsmen, foremen, and kindred	102
Bankers	109
Brickmasons, stonemasons, and tile setters	93
Carpenters	98
Compositors and typesetters	115
Electricians	101
Linemen	105
Machinists	105
Automobile mechanics and repairmen	103
Office machine mechanics and repairmen	100
Radio, and television mechanics and repairmen	99
Millwrights	112
Painters, construction and maintenance	101
Plumbers and pipefitters	101
Tool-and-die makers and die setters	91
Operatives and kindred	103
Attendants, automobile service and parking	107
Bus, truck and tractor drivers, taxi drivers, and chauffeurs	109
Delivery and routemen	104
Laundry and dry cleaning operatives	97
Meat cutters	96
Welders and flame cutters	111
Service workers, except private household	101
Practical nurses	97
Waiters and waitresses	101
Laborers, except farm and mine	91
Farmers, farm managers	101

fact accounted for the general overall superiority of method A, which takes into account local industry-occupational levels, than method A^1.

Method A worked somewhat better for occupations concentrated in a small number of industries than for occupations scattered throughout many industries. For example, the results of the method for practical nurses (97 percent), waiters and waitresses (101 percent), professional nurses (102 percent), and radio and TV repairmen (99 percent), were particularly good, and less so for secretaries (93 percent), draftsmen (106 percent), office machine operators (111 percent), and machinists (105 percent). However, the opposite was true in several instances; for example, the result for bank tellers should have been very satisfactory (92 percent), and for electricians, rather poor (101 percent).

On the basis of the limited test, several tentative conclusions can be drawn. First, method A provides generally reliable results. Second, knowledge of local industry is indispensable to improving the quality of the results; and third, the greatest industry detail available should be used in following method A.

HOW NATIONAL MANPOWER INFORMATION WAS USED TO DEVELOP MANPOWER PROJECTIONS FOR A STATE AND AREAS

The New York State Department of Labor's Manpower Projections for the State and Its Areas: A Preliminary Report on Method[21]

The Division of Research and Statistics of the New York State Department of Labor is developing projections of the number of jobs in 1970 and 1975, by occupation and industry, for New York State and its eleven major industrial areas. In making these projections the Department is utilizing--as far as they are applicable--the techniques and the over-all framework of the corresponding national projections of the U.S. Bureau of Labor Statistics, described in this bulletin.

The Division began by making estimates for 1960 and 1965 in the same detail as was desired for the 1970 and 1975 projections. The five main steps are listed below. Further on, each is described, first in connection with the 1960 benchmark figures and then in their application to later years.

1. *Labor force:* To establish the number in the labor force, by age and sex.
2. *Nonfarm jobs:* To establish the number of nonfarm wage and salary jobs, by industry.
3. *Total jobs:* To establish the total number of jobs, by industry, by adding to number 2: farm jobs, self-employed and unpaid family workers and domestics, as well as a distribution of government jobs, to conform to Census of Population industry concepts.
4. *Reconciliation:* To reconcile the conceptual differences between number 1 with number 3.
5. *Matrix:* To construct a matrix of the total number of jobs--occupation by industry division--in which the industry totals conform to those of number 3.

The resulting estimates for 1960 and 1965 and projections for 1970 and 1975 will form an integrated set. For each of the four years there is a reconciliation of labor-force estimates by age and sex with the conceptually different estimates of jobs by industry.

Benchmark Data for 1960

Before projections could be made, a framework of past data had to be obtained. The benchmark year selected was 1960, since many of the needed basic data for the State and its areas had to come from the Census of Population. However, these data could not be used without a considerable amount of adjustment. They had to be integrated with data from other sources in order to obtain a set of data which was comparable to that used by BLS in its projection process. The adjustments made in the State series for 1960 are described in some detail below. Similar adjustments were made for the areas.

The civilian labor force, by age and sex

The basic 1960 Census of Population civilian labor force data for New York State, by age and sex, contained in table 5, were first adjusted to a Current Population Survey basis and then were further adjusted from the March-April 1960 Census period to a 1960 annual average basis. (See tables 6 and 7.) These adjustments were made by applying national relationships.

Nonfarm wage and salary jobs, by industry

A detailed set of figures by industry was essential, since it is the framework necessary for utilizing the BLS industry-occupation matrix. Nonfarm job data for New York State for 1960 from the BLS-State program had been published for manufacturing in selected 2-digit, 3-digit, and 4-digit detail and for nonmanufacturing in 1-digit and 2-digit detail. For some nonmanufacturing industries, particularly in services, greater detail than had been published was necessary. Most of the data was obtained from unpublished estimates of the Office of Research and Statistics of the New York State Division of Employment. In the few cases where such figures were not available, estimates were made by interpolating between the 1959 and the 1962 data of *County Business Patterns.* The resulting number of nonfarm wage and salary jobs is shown in the second column of table 8, which is limited to 2-digit industry detail.

Total jobs, by industry

The BLS national matrix includes self-employed and unpaid family workers, farm employees, and domestic employees, in addition to nonfarm employment. Column 3 in table 8 shows New York State estimates for

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[21] Prepared by Abraham J. Berman, Chief Consulting Statistician of the New York State Department of Labor, assisted by Sheldon Dorfman, Associate Economist, Division of Research and Statistics. Their final, detailed statement is available in separate technical supplement to *Manpower Directions in New York State, 1965-75,* New York State Department of Labor, 1968.

Table 5. Census Population and Labor Force, New York State, 1960

(In thousands)

Age and sex	Resident population	Institutional population	Resident armed forces	Civilian noninstitutional population	Civilian labor force	Civilian labor force participation rates
Male, 14 years and over----------	5,882.2	121.5	40.1	5,721	4,555	79.6
14-19 years-------	653.4	11.4	5.0	637	203	31.9
20-24 years-------	433.7	8.7	14.0	411	350	85.2
25-34 years-------	1,055.2	18.0	11.7	1,026	986	96.1
35-44 years-------	1,126.6	16.5	7.3	1,103	1,070	97.0
45-54 years-------	1,036.1	17.1	1.8	1,017	972	95.6
55-64 years-------	842.8	18.2	0.3	824	723	87.7
65 years and over-	734.5	31.6	--	703	251	35.7
Female, 14 years and over----------	6,506.5	98.4	1.0	6,407	2,403	37.5
14-19 years-------	677.4	5.8	0.2	671	178	26.5
20-24 years-------	500.1	2.5	0.3	497	262	52.7
25-34 years-------	1,132.3	6.6	0.2	1,126	413	36.7
35-44 years-------	1,234.3	9.2	0.1	1,225	534	43.6
45-54 years-------	1,124.3	11.8	0.1	1,112	559	50.3
55-64 years-------	913.3	13.8	0.1	899	347	38.6
65 years and over-	924.7	48.7	--	876	110	12.6

Source: U.S. Bureau of the Census, U.S. Census of Population: 1960, Vol. I, Part 34, New York, tables 107 and 115.

these elements and column 1 shows the total jobs figures that result from adding in these estimates.

Our first step toward making these estimates utilized the ratio of self-employed and unpaid family workers to private wage and salary workers, by industry, from table 122 of the 1960 Census of Population. The ratios were applied to the average 1960 nonfarm wage and salary worker data and the resulting figures were totaled. Since the total did not agree with the total that had been obtained as part of the work force estimates of the Division of Employment, which used the U.S. Bureau of Employment Security methods – adjustment of these figures was necessary. The adjustments were made in trade and service, large industry segments in which most self-employed persons are found. Data from the 1958 Census of Business seem to indicate somewhat higher ratios of self-employed among the workers of these industries than were indicated by the Census of Population ratios, and this fact was utilized in making the adjustments. The estimates of the Division of Employment, made as part of their work force series, of the number of farm and domestic workers, also were added to obtain the total number of jobs.

The Census of Population concept of government employment by function or industry is utilized in the occupation-industry matrix; accordingly, the number of government workers in schools, hospitals, construction work, etc., had to be estimated and assigned to their respective industries. This concept is in contrast to the concept used in the nonagricultural wage and salary-work force series, in which all work for government agencies is considered a separate industry division, classified by employer: Federal, State, and local. The basic source used to classify by function the State and local government work done in New York State was the Census of Governments for 1957 and 1962. Its classification proved to be far more satisfactory than that of the Census of Population, where government workers appear in industries in which no governmental jobs exist in New York State. For Federal employment, the basic source used was the insured employment record of the Division of Employment, where data are obtainable for individual Federal agencies classified by industry. Table 8 indicates the number of government jobs, by industry. Added to the other elements in the table, these data complete the estimate of total jobs, by industry, in 1960.

Table 6. Adjustment of the New York State Census Civilian Labor Force Participation Rates to an Annual Basis Comparable with the U.S. Current Population Survey (CPS), 1960

Age and sex	New York Census civilian labor force participation rates (percent) 1/ (1)	Ratio of U.S. participation rates April CPS ÷ Census (2)	New York participation rates adjusted by U.S. CPS-Census ratio (percent) (3)	Ratio of U.S. participation rates annual average ÷ March-April average (4)	Annual New York State civilian labor force participation rate, 1960 (percent) (5)
Male					
14-19 years------	31.9	1.092	34.8	1.123	39.1
20-24 years------	85.2	1.018	86.7	1.013	87.8
25-34 years------	96.1	1.011	97.2	1.005	97.7
35-44 years------	97.0	1.008	97.8	1.001	97.9
45-54 years------	95.6	1.017	97.2	1.003	97.5
55-64 years------	87.7	1.017	89.2	1.005	89.6
65 years and over-----------	35.7	1.067	38.1	.997	38.0
Female					
14-19 years------	26.5	1.074	28.5	1.162	33.1
20-24 years------	52.7	1.020	53.8	1.024	55.1
25-34 years------	36.7	1.010	37.1	1.020	37.8
35-44 years------	43.6	1.030	44.9	1.000	44.9
45-54 years------	50.3	1.055	53.1	1.014	53.8
55-64 years------	38.6	1.055	40.7	1.019	41.5
65 years and over-----------	12.6	1.009	12.7	1.019	12.9

1/ From table 5.
2/ Derived from the Gordon Committee report (Measuring Employment and Unemployment, pp. 381-382) by taking the ratio of the April CPS to Census.
3/ Column (1) multiplied by column (2).
4/ Ratio of annual average labor force participation rates to the average of the March-April labor force participation rates, taken from the Monthly Report on the Labor Force.
5/ Column (3) multiplied by column (4).

Reconciliation between jobs and labor force

By adding an estimate for unemployment to the total number of jobs (item 3 above), a figure for total work force as defined by the Bureau of Employment Security was obtained. The concept of total work force for a State or an area differs from the concept of resident labor force in the following respects:

a. Persons on more than one payroll are counted only once in the labor force, but are counted in the work force figures for each job held.

b. Persons who live in one State or area and commute to work to a different State or area are not counted where they reside in the labor force statistics, but where they work in the work force statistics.

c. Persons who have a job during the survey week, but are not at work and not paid, are considered employed in labor force counts, but not in the work force statistics.

Table 9 indicates the size of the elements of difference between the civilian labor force count, less the unemployed, and the total job count in New York State for 1960. When the comparison first was made, a relatively small statistical discrepancy was found. It was eliminated by increasing slightly the labor force participation rates presented in column 5 of table 6. This adjustment accounts for the difference between these rates and those finally used in table 7.

The New York State industry-occupation matrix

One of the major determinants of differences in occupation structure among areas is difference in indus-

Table 7. New York State Civilian Population and Labor Force, 1960

(In thousands)

Age and sex	New York State civilian non-institutional population (1)	Annual New York State civilian labor force participation rates (2)	New York State civilian labor force (3)
Total, 14 years and over	12,161	59.8	7,273
Male, 14 years and over	5,737	82.0	4,704
14-19 years	648	39.2	254
20-24 years	415	88.0	365
25-34 years	1,021	97.9	1,000
35-44 years	1,105	98.2	1,085
45-54 years	1,017	97.4	991
55-64 years	825	89.7	740
65 years and over	706	38.1	269
Female, 14 years and over	6,424	40.0	2,569
14-19 years	680	33.8	230
20-24 years	500	54.9	275
25-34 years	1,123	37.8	425
35-44 years	1,225	45.0	551
45-54 years	1,113	53.8	599
55-64 years	901	41.6	375
65 years and over	882	12.9	114

1. The April 1960 civilian population was moved to July by linear interpolation between the April 1960 Census Population and the July 1965 population estimates prepared by the New York State Office of Planning Coordination.

2. Based on table 6 column 5, adjusted to eliminate the statistical discrepancy in table 9 (See text.)

3. Column (1) multiplied by column (2).

try structure. If industry structure were the only determinant, application of the national industry-occupation matrix to a State or area's industry structure would be possible and a reasonably good set of occupation estimates could be obtained.

Testing this possibility by using data on occupation by industry in the 1960 Census of Population showed that, although industry differences do account for a great deal of the difference in occupation structure, other factors are important.[22] The presence of central administrative offices, research laboratories, and other supporting activities of a given industry in one State and their absence in another will give the two States different job structures in the same industry. Another important factor is the state of technological advance at which different firms in different areas within the same industry operate. Consequently, an independent matrix for New York State and its areas was obtained by industry division and detailed occupation for the benchmark year 1960. Constructing it involved the following steps:

Step 1. Table 10 presents by industry division and occupation group the New York State employment data of table 125 of the 1960 Census of Population. Such data are available for each State and for each major labor market area in the country.

Step 2. One deficiency in these raw data is that about 6 percent of employed persons are unclassified as to industry or occupation or both. Within each industry division, the "not reported" element had to be allocated into occupations. Wide variations in the "not reported" element appeared among the age, sex, color, and area breakdowns (New York Metropolitan Area vs. Remainder of State). For example, "not reported" among white males was 4 percent, among nonwhite males, 12 percent. The "not reported" element, therefore, was prorated separately within each age-sex-color group. Data in Census of Population table 123 were drawn on for occupation distributions and table 128 for industry distributions. Table 11 shows the resulting industry totals (column 1) and occupation totals (row 1). The cross tabulation of table 9 was adjusted to the new

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[22] See Berman, Abraham J., "Problems of Manpower Projections in New York State," *Temple University Bulletin*, June 1966, p. 27.

Table 8. Total Jobs in New York State by Class of Worker, 1960

(In thousands)

Industry	Total jobs	Nonagricultural wage and salary employment 1/	Self-employed unpaid family workers. agricultural employment and domestics	Government
Total employment	7,265.0	5,344.2	1,083.0	837.8
Manufacturing	1,951.2	1,878.8	57.0	15.4
Durable goods manufacturing	948.8	911.2	22.2	15.4
Lumber and wood products	18.8	16.4	2.4	--
Furniture and fixtures	37.4	35.5	1.9	--
Stone, clay and glass products	50.0	48.6	1.4	--
Primary metal industries	77.5	77.1	0.4	--
Fabricated metal products (including ordnance, except fire control equipment)	105.4	100.0	3.0	2.4
Machinery, except electrical	162.0	159.1	2.9	--
Electrical machinery, equipment and supplies	166.9	165.7	1.2	--
Transportation equipment	112.1	98.6	0.5	13.0
Instruments (including fire control equipment)	121.6	116.8	4.8	--
Miscellaneous manufacturing	97.1	93.4	3.7	--
Nondurable goods	1,002.4	967.6	34.8	--
Food and kindred products	163.0	156.7	6.3	--
Tobacco manufactures	2.9	2.8	0.1	--
Textile mill products	65.4	63.3	2.1	--
Apparel and other finished products	333.4	318.9	14.5	--
Paper and allied products	70.2	69.4	0.8	--
Printing, publishing and allied industries	180.2	172.9	7.3	--
Chemicals and allied products	90.3	89.2	1.1	--
Petroleum refining and related industries	12.9	12.8	0.1	--
Rubber and miscellaneous plastics products	20.8	20.2	0.6	--
Leather and leather products	63.3	61.4	1.9	--
Agriculture, forestry and fisheries	174.7	9.5	163.5	1.7
Agriculture	173.0	9.2	162.1	1.7
Forestry	0.5	--	0.5	--
Fisheries	1.2	0.3	0.9	--
Mining	9.5	9.1	0.4	--
Metal mining	3.1	3.0	0.1	--
Oil and gas extraction	1.5	1.4	0.1	--
Nonmetallic mining and quarrying	4.9	4.7	0.2	--
Construction	379.0	261.8	71.4	45.8
Transportation, communication and public utilities	584.3	482.2	25.3	76.8
Railroads	65.5	65.3	0.2	--
Air transportation	39.6	37.0	0.1	2.5
Local and interurban passenger transportation	87.2	44.1	7.8	35.3
Motor freight transportation and warehousing	86.8	75.0	11.8	--

See footnote at end of table.

Table 8. Total Jobs in New York State by Class of Worker, 1960--Continued

(In thousands)

Industry	Total jobs	Nonagricultural wage and salary employment 1/	Self-employed unpaid family workers, agricultural employment and domestics	Government
Water transportation	73.7	68.4	0.3	5.0
Pipelines	0.2	0.2	--	--
Services incidental to transportation	23.8	20.6	3.2	--
Communication	116.0	115.7	0.3	--
Electric, gas and sanitary services	91.5	55.9	1.6	34.0
Wholesale and retail trade	1,540.6	1,251.1	286.8	2.7
Wholesale trade	484.2	419.3	64.9	--
Retail trade	1,056.4	831.8	221.9	2.7
Lumber, building materials, farm equipment	41.7	31.9	9.8	--
General merchandise stores	166.5	149.4	15.6	1.5
Food stores	200.4	145.4	55.0	--
Automotive dealers and gasoline service stations	101.7	78.5	23.2	--
Apparel and accessories	116.2	99.0	17.2	--
Furniture, homefurnishings and equipment	50.3	37.7	12.6	--
Eating and drinking places	252.8	202.1	49.5	1.2
Miscellaneous retail stores	126.8	87.8	39.0	--
Finance, insurance and real estate	531.5	483.2	37.8	10.5
Banking and credit agencies	137.9	136.8	1.0	0.1
Brokers and investment companies	63.5	58.7	4.8	--
Insurance	169.3	162.4	6.4	0.5
Real estate	160.8	125.3	25.6	9.9
Services	1,763.6	968.5	440.8	354.3
Hotels and lodging places	81.7	72.4	9.2	0.1
Personal services	160.9	102.5	58.4	--
Miscellaneous business services	197.6	170.0	27.6	--
Automobile repair services and garages	36.0	26.2	9.8	--
Miscellaneous repair services	28.3	15.8	12.5	--
Motion pictures and other amusement and recreation services	84.8	72.3	10.4	2.1
Medical and other health services	375.5	193.4	62.0	120.1
Legal services	50.2	30.2	20.0	--
Educational services and museums	347.2	108.9	10.2	228.1
Nonprofit membership organizations	123.1	115.2	4.0	3.9
Miscellaneous services	90.4	61.6	28.8	--
Private household workers	187.9	--	187.9	--
Public administration	330.6	--	--	330.6
Postal service	79.8	--	--	79.8
Other federal	62.9	--	--	62.9
State	41.4	--	--	41.4
Local	146.5	--	--	146.5

1/ Excluding government.

marginal totals, omitting the "not reported" group, by a prorata process.[23]

The following tabulation presents a comparison for the "not reported" group, by industry division and by occupation group. The first column shows the result that would have been obtained, if the prorating had been made on the basis of the total distribution omitting the "not reported" group. The second column presents the result of prorating the "not reported" group in each age-sex-color-area cell separately and adding the results. The resulting distribution, shown in the tabulation below, reflects the differences in the proportion of "not reported" in each cell and indicates that higher proportions of lower-skill workers should be used in adjusting for this group.

Percent Distribution Of "Not Reported" By Industry And Occupation

Industry division and occupation group	"Not reported" prorated: Proportionately	"Not reported" prorated: By age, color, sex and area
All industries	100.0	100.0
Agriculture	1.9	1.5
Mining	0.2	0.2
Manufacturing	30.2	29.0
Construction	5.2	4.5
Transportation and public utilities	8.1	7.9
Wholesale and retail trade	19.2	19.4
Finance, insurance, and real estate	6.6	6.9
Services and miscellaneous	23.6	25.7
Public administration	5.0	4.8
All occupations	100.0	100.0
Professional, technical and kindred workers	13.3	12.5
Managers, officials and proprietors[1]	10.6	8.9
Clerical and kindred workers	19.3	20.7
Sales workers	7.8	7.5
Craftsmen, foremen and kindred workers	13.2	11.3
Operatives	19.3	19.9
Service workers, including private household	12.1	14.4
Laborers, including farm	4.5	4.8

[1] Includes farmers and farm managers.

Step 3. Table 12 shows the results of step 3, which was to shift the occupation distribution by industry division from its Census residence basis (table 12) to a total jobs basis (table 8).

Step 4. Within the table 11 framework of industry division and occupation group, detailed occupation estimates by industry division then were made. Table 125 of the 1960 Census of Population gives information on the industry distribution in New York State of some individual occupations. The detail needed for most individual occupations, however, is not given in that table. Most individual occupations are grouped into an all-other category within each occupation group. For these all-other categories, information on New York totals of individual occupations can be obtained from table 120 in the Census volume. Information for the country as a whole, given in Census volume PC 2 (7C), was utilized to prorate the individual occupations within the all-other group on an industry division basis. These estimates were totaled and prorated to agree with the industry division breakdown of the all-other group for the State. In this way, a set of detailed occupational statistics by industry division, using Census data, was obtained. These data then were adjusted to a total jobs basis by prorating the breakdown of occupations in each industry division to the totals by occupation group obtained in Step 3 and shown in table 12.

The procedure can be illustrated by indicating how the number of jobs by detailed occupation was derived for one occupation group–professional, technical, and kindred workers; jobs by detailed occupation within the other occupation groups were derived in a similar manner. Census table 125 for New York State shows an industry breakdown for 19 specified professional occupations for males and eight for females. The first step, then, was to fill in the data for those occupations in which data for one sex was missing. The national patterns in Census Report PC 2 (7C) were used. The following tabulation uses female lawyers as an example.

Estimating The Number of Female Lawyers by Industry Division In New York State in 1960

Industry division	United States: Number	United States: Percent	New York State
Total employment	7,140	100.0	1,450
Manufacturing	39	0.5	7
Contract construction	101	1.4	20
Transportation and public utilities	40	0.6	9
Wholesale and retail trade	61	0.9	13
Finance, insurance, and real estate	383	5.4	78
Services and miscellaneous	4,768	66.9	971
Public administration	1,728	24.3	352
Not reported	20	–	–

Their national percent distribution by industry division, applied to the 1,450 employed female lawyers in New

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[23] For a short method of iterating a cross tabulation to marginal totals, see Dening, W. Edwards, *Statistical Adjustment of Data*, 1964 edition, New York, Dover Publications, Inc., p. 121 ff.

York State (this figure is taken from Census table 120) yields their estimated employment by industry division in the State. In the same manner employment estimates were derived for the other professional occupations in which data for either sex were missing. By using the above procedure, estimates were made for missing detailed occupation-sex components, and the resulting "other" group was made consistent for each sex by subtracting these estimates. Totals for the "other" group, by industry division, were made in this manner for the State and each area.

Since the matrix needed figures for individual occupations included in the "other" group, these figures were estimated by utilizing the data from Census volume PC 2 (7C). The following tabulation uses librarians, male and female, as an example. Their national percent distribution by industry division was applied to the 8,880 librarians in New York State (Census table 120).

Estimating The Total Number Of Librarians In New York State By Industry Division In 1960

Industry division	United States		New York
	Number	Percent	State
Total employment	84,332	100.0	8,800
Agriculture	80	0.1	9
Mining	62	0.1	9
Manufacturing	122	0.1	9
Contract construction	2,432	2.9	258
Transportation and public utilities	404	0.5	44
Wholesale and retail trade	321	0.4	36
Finance, insurance, and real estate	360	0.4	36
Services and miscellanoeus	77,466	92.1	8,177
Public administration	2,843	3.4	302
Not reported	242	--	--

The other professional occupations were treated in the same way.

However, the national occupation-by-industry distribution for "other" professionals differs from New York State's, so that, when all such estimates were added, the sums by industry division differed from those previously derived for "other" professionals. Therefore, the data had to be prorated using an iterative procedure[24] so that the sum of the detailed occupations by industry division add to the number of "other" professionals and at the same time each individual occupation by industry division adds to its occupation total as shown in Census table 120.

After estimates were obtained for each of the Census professional occupations, by industry division, the detailed occupation data were prorated to sum to total professional jobs by industry division, shown in table 12. For example, in manufacturing, in order to shift professional employment by detailed occupation from a Census basis to a total jobs basis, the Census figure for each occupation was multiplied by 0.981 (the ratio of the 166,700 jobs shown in table 12 to the 169,900 resident employed shown in table 11). A similar breakdown of jobs by detailed occupation and industry division was made for each of the other cells.

Step 5. Deficiencies exist in Census information about occupations, which were obtained from one member of a household. Consequently, other data were used where available. The New York study utilized the State's own study of technicians, scientists, and engineers, as of 1962,[25] and its study of the metal trades, as of 1957.[26] New York State Education Department data on the number of teachers and on licensees in several professional occupations, such as physicians were used. New York State data on the number of apprentices also were utilized. Most important of all, occupational data from a 1960 wage study that covered most nonmanufacturing industries in the State were used.[27]

In many cases, the occupational figures from these sources, when adjusted to a 1960 basis, were different from those in the 1960 Census. They basically were more reliable than the Census since they had been compiled primarily from employer reports. Consequently, they were substituted for the Census data, wherever they applied. In some cases the totals by occupational group had to be shifted. Increasing the number of workers in one occupation because of known outside data meant that the number in other occupations had to be reduced. By and large, where such adjustments did not offset each other, they were made in the "all other" category of the group. The largest adjustments among occupation group totals involved a shift from sales workers to clerical workers and laborers in retail trade. Our 1960 retail trade wage study showed a larger proportion of workers in clerical occupations (checker, etc.) and laborers (stock boy) than did the Census, and showed a smaller proportion in sales than did the Census.

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[24] Ibid.

[25] *Technical Manpower in New York State,* New York State Department of Labor, Division of Research and Statistics.

[26] *Manpower in Selected Metal Crafts in New York State,* New York State Department of Labor, Division of Research and Statistics, Publication B-107.

[27] *Wages and Hours in Industries Covered by the Minimum Wage Law, New York State, 1960-1961,* New York State Department of Labor, Division of Research and Statistics, Publication B-132.

Table 9. Work Force and Labor Force Reconciliation, New York State

(In thousands)

Procedure	1960
Adjusted census civilian labor force 1/	7,273
Unemployment rate (percent) 2/	5.0
Unemployed	363
Resident employed 3/	6,910
Less nonagricultural self-employed and unpaid family workers and domestics 4/	920
Less agriculture 4/	163
Census nonagricultural resident wage and salary workers 5/	5,827
BLS nonagricultural wage and salary workers 6/	6,182
Difference	355
Net commutation 7/	144
Dual job holders less those with a job but not being paid 8/	211
Discrepancy	--

1/ For derivation of 1960 see table 7, column 3.

2/ From New York State Department of Labor, Division of Employment, estimated by using the Bureau of Employment Security method.

3/ a. Row 1 minus row 3.

4/ New York State Department of Labor, Division of Employment, estimated by Bureau of Employment Security method.

5/ U.S. Census of Population, Vol. I, Part 34, table 122.

6/ U.S. Department of Labor, Bureau of Labor Statistics, Employment and Earnings for States and Areas 1939-65, Bulletin 1370-3.

7/ Data for SMSA's can be obtained from Population Census PC2 (6B), Journey to Work. In deriving net commutation for New York State the data were taken from the New York State Department of Commerce, Commuting from County to County in New York State (Research Bulletin No. 11); however, for States, where no such data are available, a good approximation of commuting patterns can be derived by using table 132 of the Population Census for the State and contiguous States. (Commutation from noncontiguous States is relatively small.) People who live in one State and commute to work in another are counted in the civilian labor force by place of residence (rows 1 and 4) and are counted in the nonagricultural employment data by place of work (row 5).

8/ Dual job holders are counted more than once in the BLS nonagricultural wage and salary workers figures (row 5) but not in the Census nonagricultural resident wage and salary workers (row 4). National data suggests that dual jobs amount to 5 percent of all jobs and this factor (actually 4.9 percent) was used for the State. Those with a job but who did get paid during the week because they were sick, on vacation or on strike were counted among the Census resident wage and salary workers but not among the BLS nonagricultural wage and salary workers. Their number amounts to about 1.5 percent of the labor force nationally and this number was used for the State. A net rate of 3.4 percent (4.9 minus 1.5) multiplied by row 5 was used to derive row 8.

If BLS nonagricultural employment (row 5) plus agricultural employment (row 7) plus self-employed and unpaid family workers and domestics (row 5) are added together, total jobs are derived (7,265,000 in 1960). If unemployment (row 3) is added total work force is determined.

Table 13 presents the final detailed occupation-by-industry-division distribution of the number of jobs in the State in 1960. A similar distribution was prepared for each area.

Estimates for 1965

Once the benchmark set of data described above was completed for 1960, a set of estimates for 1965 was made. The procedure used for the industry-occupation matrix for 1965 was similar to that utilized for 1970 and 1975, which will be described at a later stage. Nonfarm employment by industry for 1965 was available from the same sources as the 1960 data.

Total job figures for 1965 were calculated by using the same method employed in 1960. The ratios for self-employed and unpaid family workers to wage and salary workers obtained in 1960 were utilized for 1965, and the results were adjusted to agree with the total available from the New York State Division of Employment's work force estimate. Federal government workers for 1965 were distributed by industry, using Division of Employment data. To distribute State and local government employment, data from the Division of Employment and the Census Bureau's Governments Division were utilized.[28] Where no data were available, distributions from the 1962 Census of Governments were used.

The only new element that arose in estimating the data for 1965 was in the calculation of labor force by age and sex. For this purpose, a set of population estimates and projections at 5-year intervals by 5-year age-sex groups, compiled by the Cornell Aeronautical Laboratories for the State Office of Planning Coordination was utilized.[29] These population estimates were adjusted to a noninstitutional civilian population basis by utilizing the information for 1960 and by assuming that the changes in these groups from 1960 to 1965 were the same in each age-sex group as those in the population as a whole. Labor force participation rates then were estimated, first by utilizing the change that occurred nationally in each age-sex cohort between 1960 and 1965.[30] When these ratios to the population figures had been applied, the resulting estimate for total civilian labor force showed an increase of about 3.5 percent between 1960 and 1965. About 3.1 of the 3.5 percent represented the result of population changes, a fact derived by applying the 1960 participation rates to the 1965 population.

In contrast to the 3.5 percent change between 1960 and 1965 in estimated civilian labor force, there was a change of only 2.9 percent in estimated work force. The current population counts by age and sex could have been wrong, or the work force estimates could have been wrong. However, both possibilities seemed unlikely, because the work force estimates are in large part determined by actual measurement for the State and because the population estimates, except for net migration, are determined similarly. The discrepancy was sought in one of the other elements of the estimating process. Tremendous changes could have taken place in the net commutation pattern. However, this factor was discounted. The one remaining element of major significance was the assumption that New York's labor force participation rates had changed between 1960 and 1965 at the same rate as those nationally. If this assumption was erroneous a reasonable set of figures with which to reconcile our 1960 and 1965 data by age, sex, and industry might be obtained by using changes in national participation rates, modified between 1960 and 1965, particularly for women. After the data were modified, a reconciliation for 1965 between the total number of jobs and the labor force was obtained similar to the one for 1960, given in table 9.

Projections for 1970 and 1975

Labor force and nonfarm employment projections

The projections for 1970 and 1975 build on the base of population projections made for the State Office of Planning Coordination by the Cornell Aeronautical Laboratories, which were mentioned earlier. This set of projections had the advantage of presenting figures for each county of the State, so that area projections could be made on the same basis as for the State as a whole. They were amended to a civilian noninstitutional basis in a manner similar to that used for 1960.

Changes shown by national projections of labor force participation rates were now utilized to obtain a first approximation of the labor force in 1970 and 1975, and these figures were amended later by a method similar to that described in connection with the 1965 data to reconcile the labor force totals with the total job figures. Unemployment was assumed to average 4 percent for the State as a whole. In some areas, lower levels of unemployment appeared reasonable; in other areas, somewhat higher levels were used.

Several experimental procedures were used to project nonagricultural employment for 1970 and 1975. One approach was to use logarithmic regression, another to use linear regression. Both were applied to the Statewide employment data, and then both were applied to the State data as a percent of the United States data. The results of the four methods were compared and the decision was made to utilize as the basic regression model $\log Y = a + bt$, where Y represents for each industry the percent that New York's employment is of national employment for each year of the period 1947-65, and t = time in years.

The proportions were projected to 1970 and 1975 and, because they were in terms of percent of national nonagricultural employment, were multiplied by the BLS national employment projections, on a 4-percent-unemployment-level base, to obtain projected employment in New York State for 1970 and 1975.

For industries where a more detailed breakdown than 2 digits was needed in manufacturing and 1 digit in

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[28] See *Public Employment in 1965* and *City Employment in 1965*. Also *Distribution of New York State Positions by County and Agency, 1964*, New York State Civil Service Commission.

[29] *Demographic Projections for New York State Counties*, New York State Executive Department, Office of Planning Coordination.

[30] Cooper, Sophia and Denis Johnston, "Labor Force Projections for 1970-80," *Monthly Labor Review*, February 1965, p. 130.

Table 10. Census Employment in New York State, Occupation Group, by Industry Division, 1960

Industry division	Total, all occupations	Professional	Managers 1/	Clerical	Sales	Craftsmen	Operatives	Service workers 2/	Laborers 3/	Not Reported
Total, all industries------	6,599,462	825,021	654,266	1,195,851	483,177	818,262	1,197,249	747,148	277,391	401,097
Agriculture------------	118,850	2,552	63,232	1,499	507	996	2,123	511	47,332	98
Mining-----------------	11,531	939	879	1,722	92	2,712	4,781	195	--	211
Construction-----------	321,894	16,312	29,279	15,735	1,548	171,737	24,691	2,380	57,668	2,544
Manufacturing----------	1,886,379	159,494	119,961	277,143	80,983	339,231	801,517	24,158	54,489	29,403
Transportation---------	508,572	26,746	36,493	134,087	3,939	98,071	135,340	19,245	48,418	6,233
Trade------------------	1,202,643	32,782	226,805	195,692	326,060	83,576	126,448	168,738	27,847	14,695
Finance----------------	409,243	17,801	67,742	206,440	55,906	8,867	2,825	38,557	6,561	4,544
Service----------------	1,474,825	530,414	80,605	219,499	12,116	94,326	86,927	419,369	17,007	14,562
Public administration--	313,773	35,440	25,652	138,388	243	15,936	8,139	71,418	13,918	4,639
Not reported-----------	351,752	2,541	3,618	5,646	1,783	2,810	4,458	2,577	4,151	324,168

1/ Includes farmers and farm managers.
2/ Includes private household workers.
3/ Includes farm laborers.

Source: U.S. Census of Population, Vol. I, Part 34, Table 125.

Table 11. Census Employment in New York State, Occupation Group by Industry Division, 1960 1/

Industry division	Total, all occupations	Professional	Managers 2/	Clerical	Sales	Craftsmen	Operatives	Service Workers 3/	Laborers 4/
Total, all industries----------	6,599,462	874,991	689,810	1,279,052	513,172	863,758	1,276,952	805,032	296,695
Agriculture----------------	123,966	2,620	65,248	1,563	524	1,025	2,204	535	50,247
Mining---------------------	12,093	998	935	1,851	98	2,880	5,121	210	--
Manufacturing--------------	1,988,552	169,900	127,835	298,563	86,474	360,699	859,176	26,165	59,740
Contract construction-------	337,851	17,164	30,819	16,740	1,633	180,350	26,147	2,548	62,450
Transportation and public utilities----------------	536,426	28,337	38,683	143,659	4,183	103,721	144,309	20,733	52,801
Wholesale and retail trade--	1,270,790	34,856	241,238	210,380	347,504	88,676	135,262	182,400	30,474
Finance, insurance, and real estate--------------	433,681	18,923	72,040	221,870	59,570	9,407	3,020	41,671	7,180
Services and miscellaneous--	1,565,335	564,637	85,832	236,230	12,928	100,177	93,039	453,861	18,631
Public administration-------	330,768	37,556	27,180	148,196	258	16,823	8,674	76,909	15,172

1/ "Not reported" were prorated by age, sex, color, and residence.
2/ Includes farmers and farm managers.
3/ Includes private household workers.
4/ Includes farm laborers.

nonmanufacturing, the trend of New York's employment as a percent of United States employment between 1960 and 1965 was extrapolated to 1970 and 1975. The reason for using 1960 and 1965 to find a trend, rather than seeking a longer-range trend, was the lack of comparable data before 1958 for New York State, its areas, and the United States, at the 3-digit level. In addition, 1960 was the year in which the standard for a coverage under the New York State Unemployment Insurance Law was reduced to one employee or more; so that, beginning with 1960, insured employment data could be used without small-firm adjustments. The resulting percentages were multiplied by the BLS national projections and prorated to the 2-digit manufacturing and 1-digit nonmanufacturing totals previously projected by the regression line method. The following tabulation gives an example of this process for two industry subgroups that together constitute industry group X. The projections for the two subgroups (line J in the table) add up to 112,200. This figure is a little more than the 111,400 that the regression-line method yielded for industry group X. Prorating scales the two subgroup figures down proportionately, so that their sum just equals 111,400 (line M).

Projection Of Total Jobs To 1970 For 3-Digit Subgroups Of 2-Digit Industry Group X

Step	Subgroup A	Subgroup B	Total = Industry group X
A. 1960 national estimate	326,400	27,900	354,300
B. 1960 State estimate	95,700	6,100	101,800
C. 1960 national-State ratio (B/A)	0.293	0.219	–
D. 1965 national estimate	352,900	29,800	382,700
E. 1965 State estimate	96,800	7,400	104,200
F. 1965 national-State ratio (E/D)	0.274	0.248	–
G. Ratio of 1960 ratio to 1965 ratio (F/C)	0.935	1.132	–
H. 1970 national-State ratio (GxE)	0.256	0.281	–
I. 1970 national projection	400,000	35,000	435,000
J. 1970 State projection (HxI)	102,400	9,800	112,200
K. 1970 State regression-line projection	–	–	111,400
L. Ratio of K to J	–	–	0.993
M. 1970 State projections prorated to K	101,700	9,700	111,400

Area estimates of nonfarm jobs by industry were made by similar methods. These will be described in a forthcoming technical bulletin of the Division of Research and Statistics.

The total nonagricultural employment estimate in each area that resulted from this procedure then was compared with the independently estimated labor force figures, and adjustments were made to reconcile the two sets of projections. These adjustments, in most cases, were minor and did not affect significantly the overall estimating framework. When the estimates were completed, a set of labor force and nonagricultural employment figures, together with a reconciliation sheet, was sent to knowledgeable people within the New York State Departments of Labor and Commerce to check for possible circumstances that the calculations could not take account of–for example, a new plant known to be moving into an area or an important old plant about to leave the area, etc. The estimates also were compared, wherever possible, with projections made by other agencies. Again, some slight adjustments in the projections were made as a result of such local contacts. Since data for most of 1966 were available by the time the projections were completed, a check was made of 1965-66 trends to determine whether or not the 1965-70 trends were in line; some adjustments resulted from this appraisal. All the adjustments in the projections resulted in changing the final 1975 projections by less than 1 percent overall. Of course, in some industries, particularly in manufacturing, the amount of adjustment was somewhat greater.

Jobs by industry

After the nonagricultural employment figures by detailed industry by area had been prepared, these figures had to be changed from a wage and salary worker concept to a total jobs concept. The number of

Table 12. Total Jobs in New York State, Occupation Group by Industry Division: Prorated from a Census Resident Employment Basis to a Total Job Basis

(In thousands)

Industry division	Total, all occupations	Professionals	Managers 1/	Clerical	Sales	Craftsmen	Operatives	Service workers 2/	Laborers 3/
Total, all industries----------	7,265.0	960.5	799.5	1,413.0	601.2	921.5	1,317.8	912.6	338.9
Agriculture---------------	174.7	3.7	92.0	2.2	0.7	1.4	3.1	0.8	70.8
Mining--------------------	9.5	0.8	0.7	1.4	0.1	2.3	4.0	0.2	--
Manufacturing-------------	1,951.2	166.7	125.4	293.0	84.8	353.9	843.1	25.7	58.6
Contract construction-----	379.0	19.3	34.6	18.8	1.8	202.2	29.3	2.9	70.1
Transportation and public utilities---------------	584.3	30.9	42.1	156.5	4.6	113.0	157.1	22.6	57.5
Wholesale and retail trade-	1,540.6	42.3	292.5	255.0	421.3	107.5	164.0	221.1	36.9
Finance, insurance, and real estate--------------	531.5	23.2	88.3	271.9	73.0	11.5	3.7	51.1	8.8
Services and miscellaneous-	1,763.6	636.1	96.7	266.2	14.6	112.9	104.8	511.3	21.0
Public administration------	330.6	37.5	27.2	148.0	0.3	16.8	8.7	76.9	15.2

1/ Includes farmers and farm managers.
2/ Includes private household workers.
3/ Includes farm laborers.

self-employed workers had to be added to each industry in each area, and government workers had to be distributed by industry. The breakdown for government workers, by industry or function, which had been worked up for 1960 and 1965 was used as a basis for extrapolating to 1970 and 1975 within the framework of total government employment projections derived from the regression equation. Projections for total self-employed persons and domestic employees were based on the assumption that their percentage of nonagricultural employment would change at only half the annual rate that prevailed during the 1960-65 period, since both sectors had declined sharply during that period. The number of self-employed in each industry was estimated by using 1960 ratios and then prorating the results to their total estimates. Trends derived from the 1958 and 1963 Censuses of Business were examined in order to make adjustments in the trade and service sectors as to the number of self-employed. Licensing trends also were consulted, for example, the trend in physician licenses. Agricultural employment for each area was derived from United States Department of Agriculture data, and trends determined from these data were utilized to project this segment of employment.

Occupation projections

The process that was used for obtaining total jobs by detailed occupation and industry division for the benchmark year 1960 was described earlier. From the BLS, a detailed industry-by-occupation matrix is available for the years 1960 and 1975. (Similar to that presented in appendix G, Vol. IV.) The 1960 national matrix was applied to the total number of jobs in New York State for each of the 116 industries and a set of occupation totals in each of nine industry divisions in each of the 162 occupations was obtained. Ratios were determined in each occupation-industry-division cell between the occupation figures obtained as a result of applying the 1960 national matrix and the independently estimated occupation figures from table 13. For 1975, the national matrix was applied to the independently projected New York State figures for the total number of jobs, by industry, and totals were obtained again on a detailed occupation and industry division basis. To these totals, the 1960 ratios were applied in each cell, and projections for New York State by detailed occupation and industry division for 1975 comparable to the independently estimated New York State data for 1960 were obtained. The following tabulation illustrates the procedure as applied for accountants:

The mechanical procedure can be modified where small numbers are involved (agriculture, mining) by using absolute differences rather than ratios, e.g., for accountants, in agriculture, 100-20 + 33 = 113 projected accountants in 1975.

Industry division	1960			1975	
	State independent estimates[1] A	State based on national matrix[2] B	Ratio of A to B C	State based on national matrix[3] D	Adjusted State projections (C x D) E
Total, all accountants	69,800	58,187		68,925	82,100
Agriculture	100	20	5.000	33	200
Mining	300	65	4.615	114	500
Construction	1,100	1,023	1.075	1,633	1,800
Manufacturing	14,400	11,313	1.273	11,548	14,700
Transportation and public utilities	4,800	3,897	1.232	3,898	4,800
Trade	6,400	6,214	1.030	6,254	6,400
Finance, insurance, and real estate	8,700	6,492	1.340	5,596	7,500
Services	26,800	24,601	1.089	33,988	37,000
Public administration	7,200	4,562	1.578	5,861	9,200

[1] From table 13.

[2] The BLS industry-occupation matrix for 1960 applied to total jobs in New York State in each of 116 industries; e.g., there were 333, 400 jobs in apparel in 1960 in New York State which when multiplied by 0.09%-the percent that accountants are of apparel nationally as shown in the BLS matrix-gives an estimate of 300 accountants. The number of accountants in each of the 116 industries were then added to obtain the 9 industry division totals shown in this column.

[3] Similar to column B using the 1975 BLS matrix and 1975 New York State total job projections.

After the projections were completed for all cells the figures were totaled and comparisons made between 1960 and 1975. In several cases, where occupation data were available for a series of years for New York State from other sources, independent projections were made and amendments were made in the projections that resulted from the mechanical process outlined above. Such data were available from licensing sources for doctors, dentists, and several other professional groups, and for teachers from the State Education Department. Independent projections were made for technicians by using the methods described in a report of the New York State Department of Labor on *Technical Manpower in New York State*.[31] A check also was made on the difference in 1950-60 trends by occupation in the nation and New York State as shown by 1950 and 1960 Census data, and these relationships also were utilized in amending the results of the matrix calculation.

For 1965 and 1970, occupation projections were obtained by a method similar to that used for 1975. A national matrix for these 2 years was necessary. It was devised by interpolating the 1960-75 proportions for each occupation in each industry.

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[31] *Technical Manpower in New York State*, vol. I, Supplement B, "Job Projections in Technical Occupations," New York State Department of Labor, Division of Research and Statistics.

Table 13. Total Number of Jobs in New York State by Detailed Occupation and Industry Division, 1960

(In thousands)

Occupation	Total	Agriculture	Mining	Construction	Manufacturing	Transportation	Trade	Finance	Services	Public administration
Total occupation	7,265.0	174.7	9.5	379.0	1,951.2	584.3	1,540.6	531.5	1,763.6	330.6
Professional, technical, and kindred	930.5	4.5	0.9	20.9	169.3	34.5	43.6	23.7	592.2	40.9
Engineers, technical	84.8	0.1	0.1	8.7	45.4	6.4	5.1	1.0	14.1	3.9
Engineers, aeronautical	1.7	--	--	--	1.3	0.1	--	--	0.2	0.1
Engineers, chemical	7.3	--	--	0.7	5.2	--	0.4	--	1.0	--
Engineers, civil	16.0	--	--	5.6	1.3	1.5	0.3	0.4	4.7	2.2
Engineers, electrical	26.1	--	--	0.7	17.0	3.5	1.1	--	2.8	1.0
Engineers, industrial	5.8	--	--	--	3.6	0.4	0.5	0.5	0.8	--
Engineers, mechanical	22.8	--	--	1.7	14.7	0.8	2.0	0.1	3.0	0.5
Engineers, metallurgical, etc.	1.5	--	--	--	1.1	--	0.1	--	0.3	--
Engineers, mining	0.1	--	0.1	--	--	--	--	--	--	--
Other engineers, technical	3.5	0.1	--	--	1.2	0.1	0.7	--	1.3	0.1
Natural scientists	17.9	0.5	0.1	0.1	10.7	0.3	1.3	0.1	3.9	0.9
Chemists	10.2	--	--	0.1	6.9	0.3	1.1	--	1.4	0.4
Agricultural scientists	0.7	0.5	--	--	0.2	--	--	--	--	--
Biological scientists	1.7	--	--	--	0.7	--	--	--	0.9	0.1
Geologists and geophysicists	0.4	--	0.1	--	0.1	--	0.1	--	0.1	--
Mathematicians	1.8	--	--	--	1.1	--	0.1	0.1	0.4	0.1
Physicists	2.7	--	--	--	1.7	--	--	--	0.7	0.3
Natural scientists, not elsewhere classified	0.4	--	--	--	--	--	--	--	0.4	--
Technical workers and specialists, excluding medical and dental 1/	124.8	0.1	0.1	8.0	58.7	15.9	6.2	2.3	22.7	10.8
Draftsmen	21.0	--	--	1.2	9.6	1.2	0.6	0.1	8.0	0.3
Structural design technicians and related specialists	2.6	--	--	0.6	0.5	0.1	0.1	--	1.3	--
Electro and mechanical engineering technicians	41.0	--	--	0.1	23.4	8.8	2.9	--	4.4	1.4
Electronic	10.6	--	--	--	7.7	0.4	0.1	--	1.8	0.6
Electrical	8.5	--	--	--	3.5	3.6	0.1	--	0.7	0.6
Mechanical	8.3	--	--	0.1	6.5	0.4	0.1	--	1.1	0.1
Electro-mechanical	13.6	--	--	--	5.7	4.4	2.6	--	0.8	0.1

See footnote at end of table.

Table 13. Total Number of Jobs in New York State by Detailed Occupation and Industry Division, 1960--Continued

(In thousands)

Occupation	Total	Agriculture	Mining	Construction	Manufacturing	Transportation	Trade	Finance	Services	Public administration
Mathematics technicians---	0.8	--	--	--	0.6	--	--	--	0.2	--
Physical science technicians------------------	8.7	0.1	0.1	--	6.6	0.2	0.2	--	1.3	0.2
Industrial engineering technicians------------	6.9	--	--	--	5.0	0.2	0.1	--	1.1	0.5
Civil engineering and construction technicians------------------	13.1	--	--	6.0	0.1	0.7	0.1	0.2	3.1	2.9
Sales and service technicians------------------	2.0	--	--	0.1	0.8	--	0.9	--	0.1	0.1
Technical writing and illustration technicians------------------	3.6	--	--	--	2.2	--	--	--	1.3	0.1
Safety and sanitation inspectors and related specialists------------	3.9	--	--	--	0.3	--	--	0.5	0.4	2.7
Product testing and inspection specialists--	8.2	--	--	--	7.0	0.1	0.1	--	0.5	0.5
Data processing, systems analysis and programing specialists------------	5.9	--	--	--	2.2	0.4	1.1	1.5	0.5	0.2
Airway tower specialists and flight dispatchers--	1.4	--	--	--	--	0.3	--	--	0.1	1.0
Broadcasting, motion picture and recording studio specialists------	2.9	--	--	--	0.2	2.3	--	--	0.3	0.1
Radio operators----------	2.8	--	--	--	0.2	1.6	0.1	--	0.1	0.8
Medical and other health workers------------------	186.4	1.6	--	--	2.6	0.1	12.9	0.4	167.9	0.9
Dentists-----------------	14.7	--	--	--	--	--	--	--	14.7	--
Dietitians and nutritionists------------------	3.9	--	--	--	--	--	0.1	--	3.8	--
Nurses, professional------	70.2	--	--	--	1.7	0.1	0.2	0.2	67.5	0.5
Nurses, student-----------	10.6	--	--	--	--	--	--	--	10.6	--
Optometrists--------------	1.5	--	--	--	--	--	0.4	--	1.1	--
Osteogaths----------------	0.8	--	--	--	--	--	--	--	0.8	--
Pharmacists---------------	13.8	--	--	--	--	--	12.1	--	1.7	--
Physicians and surgeons---	38.0	--	--	--	0.2	--	0.1	0.1	37.4	0.2

See footnotes at end of table.

Table 13. Total Number of Jobs in New York State by Detailed Occupation and Industry Division, 1960--Continued

(In thousands)

Occupation	Total	Agriculture	Mining	Construction	Manufacturing	Transportation	Trade	Finance	Services	Public administration
Technicians, medical and dental	24.6	0.4	--	--	0.7	--	--	0.1	23.2	0.2
Veterinarians	1.2	1.2	--	--	--	--	--	--	--	--
Chiropractors and therapists	7.1	--	--	--	--	--	--	--	7.1	--
Teachers	191.0	--	--	--	0.5	0.2	1.0	0.1	188.2	1.0
Teachers, elementary	94.7	--	--	--	--	--	0.1	--	94.5	0.1
Teachers, secondary	55.6	--	--	--	--	--	--	--	55.5	0.1
Teachers, other except college	21.9	--	--	--	0.5	0.2	0.9	0.1	19.4	0.8
Teachers, college	18.8	--	--	--	--	--	--	--	18.8	--
Social scientists	10.4	--	--	0.1	2.2	0.7	1.0	1.6	3.6	1.2
Economists	3.5	--	--	--	1.2	0.3	0.6	0.4	0.3	0.7
Phychologists	2.5	--	--	--	0.1	--	--	--	2.4	--
Statisticians and actuaries	4.0	--	--	0.1	0.9	0.4	0.4	1.2	0.6	0.4
Other social scientists	0.4	--	--	--	--	--	--	--	0.3	0.1
Other professional, technical, and kindred	315.2	2.2	0.6	4.0	49.2	10.9	16.1	18.2	191.8	22.2
Accountants and auditors	69.8	0.1	0.3	1.1	14.4	4.8	6.4	8.7	26.8	7.2
Airplane pilots and navigators	3.0	--	--	--	0.3	2.2	0.1	--	0.2	0.2
Architects	5.1	--	--	0.3	0.2	--	--	0.6	3.8	0.2
Artists, athletes, entertainers	54.7	0.7	--	--	--	1.0	3.4	0.2	48.1	1.3
Clergymen	15.8	--	--	--	0.1	--	--	--	15.7	--
Designers, except design draftsmen	6.6	--	--	--	3.6	--	1.4	--	1.6	--
Editors and reporters	16.9	--	--	0.1	13.2	0.5	0.6	0.1	2.3	0.1
Foresters and conservationists	0.6	0.2	--	--	--	--	--	--	--	0.4
Lawyers and judges	40.7	--	0.1	0.1	1.0	0.5	0.7	2.0	33.1	3.2
Librarians	9.5	--	--	--	0.3	0.1	0.1	0.1	8.7	0.2
Personnel and labor relations workers	11.8	--	0.1	0.1	5.0	0.8	1.1	0.8	1.8	2.1
Photographers	8.1	--	--	--	2.0	--	0.3	--	5.7	0.1
Social and welfare workers	19.9	--	--	--	--	--	--	0.1	12.7	7.1
Professional, technical, kindred, not elsewhere classified	52.7	1.2	0.1	2.3	9.1	1.0	2.0	5.6	31.3	0.1

See footnotes at end of table.

Table 13. Total Number of Jobs in New York State by Detailed Occupation and Industry Division, 1960--Continued

(In thousands)

Occupation	Total	Agriculture	Mining	Construction	Manufacturing	Transportation	Trade	Finance	Services	Public administration
Managers, officials, and proprietors	797.3	85.8	1.1	34.4	126.7	43.6	293.4	81.7	107.9	22.7
Conductors, railroad	4.1	--	--	--	--	4.1	--	--	--	--
Credit men	6.0	--	--	--	1.2	0.1	3.6	0.8	0.3	--
Officers, pilots, engineers, ship	4.8	0.2	--	0.2	0.2	4.1	--	--	0.1	--
Postmasters and assistant postmasters	1.7	--	--	--	--	--	--	--	--	1.7
Purchasing agents	13.1	--	0.1	0.5	7.9	0.6	2.0	--	1.2	0.8
Managers, officials, proprietors, not elsewhere classified	767.6	85.6	1.0	33.7	117.4	34.7	287.8	80.9	106.3	20.2
Clerical and kindred workers	1,443.0	2.3	1.4	21.0	291.9	156.6	282.0	269.2	269.2	149.4
Stenographers, typists, and secretaries	358.4	0.9	0.8	6.4	78.7	18.3	47.1	68.1	111.8	26.3
Secretaries	231.4	0.7	0.6	4.5	53.1	10.0	32.7	38.9	80.5	10.4
Stenographers	38.7	--	0.1	0.9	7.7	2.5	3.6	5.7	11.2	7.0
Typists	88.3	0.2	0.1	1.0	17.9	5.8	10.8	23.5	20.1	8.9
Office machine operators	50.4	--	0.1	0.2	14.2	4.1	8.1	13.7	6.0	4.0
Billing and bookkeeping machine operators	17.2	--	0.1	0.1	4.6	1.0	2.6	6.5	2.1	0.2
Key punch operators	12.9	--	--	--	3.5	1.4	1.8	3.3	1.2	1.7
Tabulating machine operators	11.2	--	--	--	3.0	1.1	1.6	2.9	1.0	1.6
Other office machine operators	9.1	--	--	0.1	3.1	0.6	2.1	1.0	1.7	0.5
Other clerical and kindred workers	1,034.2	1.4	0.5	14.4	199.0	134.2	226.8	187.4	151.4	119.1
Accounting clerks	46.9	--	--	2.4	9.6	3.2	15.6	7.5	6.4	2.2
Bookkeepers, hand	79.3	0.4	0.1	2.0	19.9	2.7	27.9	16.1	9.5	0.7
Bank tellers	20.6	--	--	--	--	--	--	20.6	--	--
Cashiers	58.4	--	--	--	1.5	3.1	43.4	2.4	7.4	0.6
Mail carriers	23.7	--	--	--	--	--	--	--	--	23.7
Postal clerks	35.0	--	--	--	--	--	--	--	--	35.0
Shipping and receiving clerks	45.8	--	--	0.1	27.1	1.8	14.8	0.2	1.4	0.4
Telephone operators	56.0	--	0.1	0.3	4.6	32.1	4.3	3.2	9.9	1.5
Clerical and kindred, not elsewhere classified	668.5	1.0	0.3	9.6	136.3	91.3	120.8	137.4	116.8	55.0

See footnote at end of table.

Table 13. Total Number of Jobs in New York State by Detailed Occupation and Industry Division, 1960--Continued

(In thousands)

Occupation	Total	Agriculture	Mining	Construction	Manufacturing	Transportation	Trade	Finance	Services	Public administration
Sales workers	568.6	0.7	0.1	2.1	82.6	4.6	385.4	71.5	21.2	0.4
Insurance agents and brokers	41.3	--	--	--	--	--	--	41.2	0.1	--
Real estate agents and brokers	19.5	--	--	0.1	--	0.1	--	19.1	0.2	--
Sales workers, not elsewhere classified	507.8	0.7	0.1	2.0	82.6	4.5	385.4	11.2	20.9	0.4
Craftsmen, foremen, and kindred workers	929.3	1.7	2.0	199.6	384.6	110.5	98.0	10.9	105.1	16.9
Construction craftsmen	224.9	0.3	0.6	157.6	30.9	9.9	6.8	2.5	13.0	3.3
Carpenters	66.3	0.2	0.1	48.8	8.2	1.9	2.6	0.5	3.3	0.7
Brickmason, stone, title setters	19.4	--	--	17.0	1.3	0.1	0.6	0.3	0.1	--
Cement and concrete finishers	1.8	--	--	1.8	--	--	--	--	--	--
Electricians	34.6	--	0.1	14.3	10.2	4.6	1.0	0.4	3.2	0.8
Excavating, grading, machine operators	11.0	0.1	0.4	9.3	0.5	0.5	0.1	--	0.1	--
Painters and paperhangers	42.6	--	--	32.0	1.8	1.0	1.2	0.9	4.4	1.3
Plasterers	4.8	--	--	4.4	0.2	--	--	0.1	0.1	--
Plumbers and pipefitters	33.9	--	--	22.6	5.7	1.8	1.2	0.3	1.8	0.5
Roofers and slaters	4.7	--	--	4.5	0.1	--	0.1	--	--	--
Structural metalworkers	5.8	--	--	2.9	2.9	--	--	--	--	--
Foremen, not elsewhere classified	123.0	0.5	0.4	10.5	76.0	13.1	13.4	0.9	5.5	2.7
Metalworking craftsmen	133.3	--	0.1	4.2	122.5	2.5	1.0	--	2.3	0.7
Machinists production and toolroom and maintenance	37.2	--	0.1	0.5	33.5	1.4	0.5	--	0.8	0.4
Machine tool operators, Class A	29.6	--	--	--	29.4	0.1	--	--	0.1	--
Blacksmiths, forge, hammermen	1.9	--	--	0.1	1.2	0.2	--	--	0.2	0.2

See footnote at end of table

Table 13. Total Number of Jobs in New York State by Detailed Occupation and Industry Division, 1960--Continued

(In thousands)

Occupation	Total	Agriculture	Mining	Construction	Manufacturing	Transportation	Trade	Finance	Services	Public administration
Boilermakers	1.6	--	--	0.3	0.6	0.3	--	--	0.4	--
Heat treaters, annealers, etc.	1.4	--	--	--	1.4	--	--	--	--	--
Millwrights	4.8	--	--	0.4	4.3	0.1	--	--	--	--
Molders, metal (excluding coremakers)	3.4	--	--	--	3.4	--	--	--	--	--
Patternmakers metal and wood	3.6	--	--	--	3.4	--	--	--	0.2	--
Rollers and roll hands	2.2	--	--	--	2.2	--	--	--	--	--
Tinsmiths	11.3	--	--	2.9	7.3	0.3	0.4	--	0.3	0.1
Toolmakers and diemakers	15.4	--	--	--	14.9	0.1	0.1	--	0.3	--
Electroplaters	1.0	--	--	--	1.0	--	--	--	--	--
Assemblers, metalwork, Class A	12.4	--	--	--	12.4	--	--	--	--	--
Inspectors, metalwork, Class A	7.5	--	--	--	7.5	--	--	--	--	--
Selected printing trades craftsmen	47.1	--	--	0.1	44.0	0.2	0.6	0.4	1.5	0.3
Compositors and typesetters	27.4	--	--	--	25.5	0.1	0.4	0.3	1.0	0.1
Electrotypers and stereotypers	1.1	--	--	--	1.1	--	--	--	--	--
Engravers, except photoengravers	2.0	--	--	--	1.7	--	0.1	--	0.1	0.1
Photoengravers and lithographers	4.5	--	--	--	4.4	--	--	--	0.1	--
Pressmen and plate printers	12.1	--	--	0.1	11.3	0.1	0.1	0.1	0.3	0.1
Selected skilled occupations, transportation, public utilities	30.9	--	--	1.1	0.8	28.7	--	--	0.1	0.2
Linemen, servicemen, telephone, telegraph and power	24.5	--	--	1.1	0.7	22.4	--	--	0.1	0.2
Locomotive engineers	4.0	--	--	--	0.1	3.9	--	--	--	--
Locomotive firemen	2.4	--	--	--	--	2.4	--	--	--	--

See footnote at end of table.

Table 13. Total Number of Jobs in New York State by Detailed Occupation and Industry Division, 1960--Continued

(In thousands)

Occupation	Total	Agriculture	Mining	Construction	Manufac-turing	Transporta-tion	Trade	Finance	Services	Public adminis-tration
Mechanics and repairmen----	226.5	0.8	0.5	15.0	56.8	38.5	46.2	6.0	54.7	8.0
Airplane mechanics and repairmen-------------	11.2	--	--	--	3.7	6.6	0.2	--	0.3	0.4
Motor vehicle mechanics--	58.3	0.3	--	0.7	3.6	7.2	23.2	--	21.8	1.5
Office machine mechanics-	4.3	--	--	--	0.6	--	2.2	--	1.4	0.1
Radio and television mechanics-------------	11.3	--	--	0.1	0.7	0.6	3.1	--	6.7	0.1
Railroad and car shop mechanics-------------	3.5	--	--	--	--	3.5	--	--	--	--
Other mechanics and repairmen-------------	137.9	0.5	0.5	14.2	48.2	20.6	17.5	6.0	24.5	5.9
Other craftsmen and kindred workers-----------------	143.6	0.1	0.4	11.1	53.6	17.6	30.0	1.1	28.0	1.7
Bakers------------------	18.8	--	--	--	12.3	--	5.3	--	1.1	0.1
Cabinetmakers------------	6.9	--	--	0.6	4.4	0.1	0.8	--	0.9	0.1
Cranemen, derrickmen, hoistmen--------------	8.4	--	0.2	1.7	4.9	1.0	0.5	--	--	0.1
Glaziers----------------	1.8	--	--	0.6	0.4	--	0.8	--	--	--
Jewelers and watchmakers-	6.9	--	--	--	0.9	--	3.3	--	2.6	0.1
Loom fixers--------------	0.2	--	--	--	0.2	--	--	--	--	--
Millers------------------	0.5	--	--	--	0.5	--	--	--	--	--
Opticians, lens grinders, etc.------------------	4.4	--	--	--	1.7	--	2.1	--	0.6	--
Stationary engineers-----	28.3	--	0.2	0.2	12.5	5.3	1.5	1.1	6.3	1.2
Inspectors, log and lumber-----------------	0.3	--	--	--	0.3	--	--	--	--	--
Inspectors, other--------	9.8	--	--	1.9	1.5	5.2	0.5	--	0.7	--
Upholsterers-------------	6.4	--	--	--	2.7	0.1	1.0	--	2.6	--
Craftsmen and kindred workers, not elsewhere classified------------	50.9	0.1	--	6.1	11.3	5.9	14.2	--	13.2	0.1
Operatives and kindred workers-------------------	1,285.8	3.3	3.8	30.4	810.7	153.7	170.2	3.9	101.7	8.1
Select semiskilled occupations, transportation, public utilities---------	272.4	1.2	0.3	14.0	50.1	124.6	64.9	1.1	12.4	3.8

See footnote at end of table.

Table 13. Total Number of Jobs in New York State by Detailed Occupation and Industry Division, 1960--Continued

(In thousands)

Occupation	Total	Agriculture	Mining	Construction	Manufacturing	Transportation	Trade	Finance	Services	Public administration
Drivers, bus, truck, tractor	161.6	0.9	0.3	13.7	27.8	69.8	41.1	0.4	4.4	3.2
Delivery, routemen, cab drivers	90.9	0.3	--	0.3	21.6	35.6	23.8	0.7	8.0	0.6
Brakemen and switchmen railroad	9.6	--	--	--	0.3	9.3	--	--	--	--
Power station operators	2.4	--	--	--	0.4	2.0	--	--	--	--
Sailors and deck hands	7.9	--	--	--	--	7.9	--	--	--	--
Apprentices	16.7	--	--	8.9	5.3	0.3	0.9	--	1.2	0.1
Asbestos-insulation workers	1.3	--	--	0.8	0.4	--	0.1	--	--	--
Semiskilled metal workers	112.0	--	0.1	2.1	106.8	0.6	0.5	--	1.3	0.6
Furnacemen, smelters, pourers	3.4	--	--	--	3.4	--	--	--	--	--
Heaters, metal	0.3	--	--	--	0.3	--	--	--	--	--
Welders and flame cutters	22.2	--	0.1	2.1	17.4	0.6	0.5	--	1.3	0.2
Electroplater helpers	1.7	--	--	--	1.7	--	--	--	--	--
Machine tool operators, metalworkers, Class B	22.5	--	--	--	22.5	--	--	--	--	--
Assemblers, metalworking, Class B	45.1	--	--	--	45.1	--	--	--	--	--
Inspectors, metalworking, Class B	16.8	--	--	--	16.4	--	--	--	--	0.4
Semiskilled occupations, textiles-apparel	109.0	--	--	--	109.0	--	--	--	--	--
Knitters, loopers, and toppers	3.8	--	--	--	3.8	--	--	--	--	--
Spinners, textile	0.7	--	--	--	0.7	--	--	--	--	--
Weavers, textile	1.7	--	--	--	1.7	--	--	--	--	--
Sewers and stitchers, manufacturing	102.8	--	--	--	102.8	--	--	--	--	--
Other operatives and kindred workers	774.4	2.1	3.4	4.6	539.1	28.2	103.8	2.8	86.8	3.6
Attendants, automobile service and parking	20.6	--	--	--	0.1	0.2	19.1	--	1.2	--
Blasters and powdermen	0.2	--	0.2	--	--	--	--	--	--	--

See footnote at end of table.

Table 13. Total Number of Jobs in New York State by Detailed Occupation and Industry Division, 1960--Continued

Occupation	Total	Agriculture	Mining	Construction	Manufacturing	Transportation	Trade	Finance	Services	Public administration
Laundry and dry cleaning operatives-------------	44.6	--	--	--	0.4	--	0.1	--	43.9	0.2
Meat cutters, except meat packing-----------	32.5	--	--	--	--	0.7	30.7	--	1.1	--
Mine operatives, laborers, not elsewhere classified------------------	2.7	--	2.7	--	--	--	--	--	--	--
Operatives and kindred workers, not elsewhere classified-------------	673.8	2.1	0.5	4.6	538.6	27.3	53.9	2.8	40.6	3.4
Service workers--------------	941.8	0.8	0.2	3.0	24.8	20.2	215.5	61.9	535.1	80.3
Private household workers--	175.7	--	--	--	--	--	--	--	175.7	--
Protective service workers-	102.9	0.2	0.1	1.2	8.1	4.5	1.9	6.2	8.9	71.8
Firemen, fire protection------------------	18.2	--	--	--	0.3	0.1	--	--	--	17.8
Guards, watchmen, doorkeepers, and bridge tenders----------------	38.0	0.2	0.1	1.1	7.5	3.2	1.5	5.7	8.3	10.4
Policemen, detectives, and other law enforcement officials---------	46.7	--	--	0.1	0.3	1.2	0.4	0.5	0.6	43.6
Waiters, cooks and bartenders---------------------	229.0	0.4	--	0.6	2.0	2.8	156.4	1.7	63.8	1.3
Bartenders---------------	29.2	--	--	--	--	--	22.5	--	6.7	--
Cooks, except private household--------------	64.9	0.4	--	0.3	0.7	1.5	35.1	0.5	25.9	0.5
Counter and fountain workers----------------	37.6	--	--	0.2	0.7	0.2	21.8	0.6	13.7	0.4
Waiters and waitresses---	97.3	--	--	0.1	0.6	1.1	77.0	0.6	17.5	0.4
Other service workers------	434.2	0.2	0.1	1.2	14.7	12.9	57.2	54.0	286.7	7.2
Airline stewards and stewardesses-----------	2.7	--	--	--	--	2.7	--	--	--	--
Attendants, hospital and other institutions-----	69.8	0.2	--	--	0.1	--	0.1	--	69.1	0.3
Charwomen and cleaners---	33.8	--	--	0.2	4.2	1.3	5.1	4.5	17.3	1.2
Janitors and sextons-----	54.5	--	--	0.5	3.5	1.6	2.5	27.5	17.3	1.6

See footnote at end of table.

Table 13. Total Number of Jobs in New York State by Detailed Occupation and Industry Division, 1960 -- Continued

(In thousands)

Occupation	Total	Agriculture	Mining	Construction	Manufacturing	Transportation	Trade	Finance	Services	Public administration
Practical nurses---------	19.2	--	--	--	0.1	--	--	--	19.0	0.1
Service workers, not elsewhere classified---	254.2	--	0.1	0.5	6.8	7.3	49.5	22.0	164.0	4.0
Laborers, except farm--------	368.7	75.6	--	67.6	60.6	60.6	52.5	8.7	31.2	11.9

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[1] The Bureau of Labor Statistics industry-occupation matrix contains 4 technical occupations whereas this table shows 18 technical occupations based on a study of technical manpower in New York State. Technical occupations will be projected independently of the national-matrix based on the method described, Technical Manpower in New York State, Vol. I, Supplement B, in New York State Department of Labor, Division of Research and Statistics.

Replacement and Job Mobility

After expected growth or decline in the number of jobs by occupation has been found, the number of deaths and retirements, estimated from working-life tables computed by BLS for the Nation on the basis of 1960 patterns, are added. (See appendix A.) The patterns were applied to Census occupation distributions, by age and sex, for the State and its areas. The resulting rates were applied to an average of the number in the occupation in 1960 at the beginning and in 1975 at the end of the period and, thus, a reasonable approximation can be made of the number of job vacancies that can be expected as a result of deaths and retirements from the work force during 1960-75.[32]

To complete the picture, an estimate should be made of the number of jobs that will be created in each occupation by job shifts as people move up and down the occupational ladder. This area of job mobility is a most important one in terms of job replacement needs, particularly at lower occupation levels, and a great deal of research is needed to determine its extent. The present state of information available on this subject may result in crude estimates of this factor, possibly limited to occupational groups only.

Conclusions

The problem of future manpower projections is like a jig-saw puzzle in which many important pieces are missing, particularly when attempts to make such projections for a State and its areas are made. However, a great many pieces can be fitted together and, with better data and techniques, in the future, some of the missing pieces possibly will be found. Although previous national, State, and New York City projections may have been off the mark in absolute dimension, they did point out fairly well the direction of change in the various occupational fields and they have illuminated the problems in the manpower field during the 1960's.

A future publication of the Division of Research and Statistics will present the method of the projection process used for New York State in greater detail.

Other Studies

Many other analytical manpower studies[33] have been undertaken recently to develop methods and project manpower characteristics at subnational levels. Several of these studies are discussed briefly below.

A major work in the field of regional employment analysis has been published in eight (regional) volumes by the U.S. Department of Commerce[34]. The information presented in these volumes is designed to provide those concerned with the economy of an area, State and county, with a factual basis for comparing its past performance with that of other areas. The data used are taken from the Censuses of Population for 1940, 1950, and 1960. The technique used by the Commerce Department is built on the assumption that two basic facts about a region's growth situation are necessary: the growth rate of the *industrial mix* (distribution of industries) and, the size and growth of the *regional share* in this industrial distribution.

The rate of growth of a particular national industry is characterized as rapid if it exceeds and slow if it falls short of the growth rate of all national industries combined over the same period. The rate of growth of an industry within a particular region is characterized as rapid if it exceeds and slow if it falls short of the growth rate of that industry nationally. Since both the industrial-mix and the regional-share factors are at work simultaneously, they may be either mutually reenforcing or mutually offsetting. In some geographic areas both factors will be positive; in others both will be negative. In still other areas one factor will be positive and the other negative[35].

The Battelle Memorial Institute has completed a study[36] for the State of Michigan and the Detroit SMSA. The study develops and uses a complex procedure of integrated matrices to project the characteristics of the labor force (industry of employment, occupation of employment, and educational attainment) in 1970, 1975, and 1980. Essentially, the approach involved a reconciliation of the supply of and demand for labor, and used formal educational attainment as the equating variable. The model developed primarily involved the following steps:

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[32] Ibid, p. 14 ff.

[33] Analytical manpower studies are based primarily on the analysis of historical data available from ongoing data collection systems. These studies may be contrasted with survey techniques which result in projections based primarily upon employer intentions.

[34] *Growth Patterns in Employment by County 1940-50 and 1950-60,* U.S. Department of Commerce, Office of Business Economics, 1965, (8 vol.: New England $.45, Mideast $.65, Great Lakes $1.50, Plains $1.75, Southeast $2.75, Southwest $1.50, Rocky Mountain $.75, and Far West $.60.), Superintendent of Documents, U.S. Government Printing Office, Washington, D.C., 20402.

[35] Although techniques for projecting industry employment are not included in these reports, considerable insight into the dynamics of regional growth can be gained from comparing the structure of growth in regions.

[36] *Michigan Manpower Study,* prepared for the State of Michigan by the Battelle Memorial Institute, Columbus, Ohio, November 1966.

> (1) A projection of future demand for employees by occupation and industry and by educational attainment. (2) A projection of the future level of educational attainment of the population, by age and sex, and derivations from this projection of the future levels of educational attainment of the labor force[37]. (3) A reconciliation of the projected demand for and the supply of labor, in terms of educational attainment. The result was a profile of future employment by industry, occupation, and educational attainment.

Industry employment levels were projected mainly by a detailed analysis of key manufacturing industries and an examination of the relationship between the Michigan and U.S. economy, especially as the national economy was projected to 1975. Other techniques that were used included econometric analysis of historical trends, projections of employment levels in key industries based upon surveys, extrapolation of historical trends, and similar techniques. Occupational requirements were projected by obtaining a special tabulation of occupational employment from the *1960 Census of Population* for Michigan and Detroit, and projecting it on the basis of detailed occupational trends at the national level and the trends represented by the 11 major occupational groups. These projected trends were modified in anticipation of technological changes and changes in the organization of individual industries over the projection period.

An econometric approach to making projections for small area economies was developed by the Bureau of Business and Economic Research, Georgia State College, Atlanta, Georgia[38]. The purpose of this study was to develop a model for estimating future rates of migration, future levels of population, income, aggregate employment, and broad industry employment for counties or other small geographic areas. Because the time series data available for counties and other small areas was limited, use was made of cross-sectional data from many counties at two points in time. Specifically, the two points were consecutive decennial census dates and the areas were 680 counties in the South. The model contains fourteen equations and was designed to reflect the dependence of population, employment, and other such variables in a small area on each other, upon income, the proximity of the area in question to a major city, and other relevant variables. The equations were solved simultaneously and the model provided projections for ten-year intervals corresponding to decennial census dates.

Economic base studies have been undertaken for a number of counties and cities in recent years. These studies usually divide the local economy into two segments: (1) Firms and individuals serving markets outside the community, export industries; and (2) Firms and individuals serving markets within the community, derivative industries. Export industries are considered the regulators of the level of economic activity and employment in an area. For example, when a local exporting coal mine closes, the impact is reflected in fewer sales of the local merchants to the jobless miners who have less to spend. The example illustrates how derivative activity is affected by changes in basic activity. As employment serving the export market rises or falls, employment serving the local market exhibits a positively correlated movement. Because of this "regulator" effect of export activity, an economic base study identifies the basic sources of employment and income, and provides a basis for understanding the source and level of all employment and income in a community.

The term "multiplier" frequently is used in base studies and refers to the impact that a change in the basic economic activity has on the aggregate level of activity within an economic unit. In the example above, basic dollars flowing into the area from sales of coal are multiplied into even greater local income through the process of spending and re-spending the basic dollars. As basic employment fluctuates, so does total employment change by some multiple, of the change in basic employment, the employment multiplier. Likewise, as basic income fluctuates, so does total income change by some multiple, of the change in basic income, the income multiplier.

The purpose of one such economic base study[39] was to provide guidance for the general economic development of a small county in West Virginia. From the economic base analysis for 1960 came an estimate of the employment multiplier—1.75. The multiplier suggested that for every 100 jobs in basic economic activity there were 75 jobs in derivative or "service" activity. From the theory underlying the multiplier analysis, the assumption is that for every additional 100 jobs in basic activity created in the area, 75 additional "service" jobs will develop.

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[37] Population projections were available from a separate source.

[38] *A Projections Model for Small Area Economies,* Roger L. Burford, Georgia State College, School of Business Administration, Bureau of Business and Economic Research, Atlanta, Ga., June 1966.

[39] *An Economic Profile of Tucker County, W. V.,* James H. Land, West Virginia University, College of Commerce, Bureau of Business Research, Economic Development Series No. 10, January 1967.

A step-by-step approach to projecting long-run industry and occupational requirements in a region was the focus of another study[40]. Methods of determining whether a local industry's employment is responsive mainly to local, State, or national demand are discussed, and several techniques for projecting industry employment corresponding to these influences are developed. Simple techniques for projecting occupational employment—primarily based on the relationship between local and national trends—are included. The importance of being familiar with current and expected changes in the environment of local industries so that judgment can be used to modify historical trends is emphasized in the report. Although the study was undertaken primarily to develop techniques adaptable to the data limitations of a small area, a case study for Silver Bow, Montana is presented in a separate volume.

The Bureau of Economic Research of The University of Colorado completed a study[41] for the Department of Labor which explores techniques for projecting occupational requirements in an SMSA with consideration for data limitations. Six different approaches were examined—two "naive" and four "sophisticated"—and the implications of each were evaluated. One "best" approach was selected and developed comprehensively for the Denver SMSA. Projections were made for 20 occupations in 10 industries.

In projecting employment, a series of industry-occupational matrices were constructed corresponding to decennial census data. Employment-output functions were developed for each industry. Output-time relations also were developed and used to make industry-output predictions. Judgments with respect to probable growth patterns of each industry were incorporated at this stage. Finally, the three phases were integrated into a complete model; output projections were related to production functions (output-employment relationships) to project future levels of industry employment which then were coupled with industry-occupational matrices to obtain projected occupational employment levels.

In a study[42] for the Eastern Massachusetts region estimates of gross product by industry, employment by industry, wages and salaries by industry, and personal income and consumer expenditures were made for 5-year intervals from 1970 to 2000. The purpose of this study was to analyze past trends in development, to anticipate the direction of future development, and to identify specific means and programs for assisting this development.

Industry employment estimates were derived by first projecting the region's constant dollar gross product by industry and then dividing the gross product by the projected value of gross product per worker in each industry. Projections of gross product for both national and local market industry groups were made by using regression techniques and least squares trend extentions of regional shares of markets. For example, gross product in 41 industries serving national markets were made by regressing regional industry gross product against a "demand" variable composed of related national GNP components and a "share" variable made up of the ratio proportion of regional to total national industry gross product. Theoretically, the demand variable accounted for growth in the industry, and the share variable accounted for the competitive position of the region in the Nation. In general, the assumption was that past trends in the region's output per worker would continue over the projection period.

A variety of techniques were used to project population, labor force, and employment by industry and occupational group to 1975 in a study of potential demand and supply of manpower for the State of Indiana[43]. Two sets of employment projections were made. They corresponded to different assumptions of growth in GNP at the national level. Multiple regression techniques were used for projecting employment in several industries, which included construction and durable goods manufacturing, as were simple regressions, least squares extensions of historical employment series, and judgmental approaches in other industries. National trends in GNP, and output and output-per-worker by industry were important in determining employment by industry in the State.

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[40] *A Manual for the Development of Estimates of Future Manpower Requirements for Training Purposes*, prepared by the Bureau of Economic and Business Research, Temple University, Philadelphia, Pa., for the Office of Manpower Policy, Evaluation and Research, U.S. Department of Labor, March 1966. In addition, see *Projective Models of Employment by Industry and by Occupation for Small Areas: A Case Study*, also prepared by Temple University, March 1966.

[41] *Methodology for Projection of Occupational Trends in the Denver Standard Metropolitan Statistical Area*, prepared for the Office of Manpower Policy, Evaluation, and Research, U.S. Department of Labor, by the Bureau of Economic Research, University of Colorado, Boulder, Colo., March 1966.

[42] *Economic Base and Population Study for Eastern Massachusetts: Vol. I, Historical Analysis; Vol. II, Prospects for Economic Growth*, Commonwealth of Massachusetts, Metropolitan Area Planning Council, 1967.

[43] *Indiana Manpower Trends to 1975*, Indiana Employment Security Division, Research and Statistics, January 1967.

Employment by occupational group was projected on the basis of changes in employment by industry between 1965 and 1975 and expected changes in the proportion of occupations in each industry group. Occupational proportions were projected on the basis of assumptions about technological and social change which resulted in an increasing proportion of professional, scientific and technical people and a decreasing proportion of laborers.

The National Center for Education Statistics of the Office of Education has developed a research paper[44] on techniques of projecting vocational education requirements at the State and area level. The paper reports on the development and test of a system to make annual projections of employment in occupations classified by vocational education programs (Occupation Education Requirements Analysis System or OERA). The output of the system is the projected employment for positions in which a particular vocational preparation *would* be useful. The purpose of the model is to provide guidance for program planning in vocational education.

The system is a three-step process. First, employment projections by industry were made.[45] Second, information on the proportion of employment in each industry that requires a specific type of vocational preparation was developed. Finally, the result was obtained by multiplying projected employment by industry by the vocational education proportions and summarizing by type of education.

The model is applied to a number of regions and the United States. The model's sensitivity in regard to industry detail and variations in assumptions of economic growth are evaluated. Research will continue on the model to incorporate variable education coefficients which reflect the changing occupational requirements by industry. In addition, the 18,000 non-collegiate titles in the latest *Dictionary of Occupational Titles*[46] have been linked to between 200 and 300 instructional courses in the seven vocational education programs. The incorporation of this detail into a comprehensive model applicable at the local level is a main objective of the current research.

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[44] *Occupation Education Requirements Analysis,* U.S. Department of Health, Education and Welfare, Office of Education, National Center for Education Statistics, Division of Operations Analysis, Technical Note No. 47, Dec. 12, 1967.

[45] In the research paper, projections made by the National Planning Association and the Bureau of Labor Statistics are used.

[46] *U.S. Department of Labor, Manpower Administration,* Dictionary of Occupational Titles, 3d edition, 2 vols., 1965.

Growth in employment requirements is not the only determinant of tomorrow's manpower needs. The need to replace experienced workers who die, retire, or leave the labor force for other reasons is also an improtant determinant of manpower requirements. About half the new entrants into the labor force during the 1965-75 decade will be needed to replace workers who die, retire, or leave the labor force for other reasons. A third factor that affects future manpower requirements is the transfer of experienced persons between occupations. Finally, at the State or area level, the occupational gains and losses due to in- and out-migration of workers may be considered, if regional analysis feel that these flows will have a significant impact on future occupational requirements. Although this chapter emphasizes the computation of employment requirements stemming from deaths and retirements, references are made to several studies of limited scope which concern the transfer of workers between occupations.

Death and Retirement Losses

Employment requirements due to deaths and retirements can be calculated in several ways. A very simple way is to determine the average working life of members of a particular occupation. If this average should, for example, be 40 years for males, then 1/40, or 2½ percent should retire or die each year. This percentage would be valid if the age distribution in the occupation were uniform i.e., if the number of workers at each age were equal. This situation could occur only if an occupation had not grown for 40 years and had had a steady influx of new young workers each year. The rate could be multiplied by the number of male workers in the occupation to obtain the actual number that would be expected to leave the occupation each year. Since the average working life for females is different than that for males, a similar calculation could be made for female workers in the occupation. (The calculation of the female rate would be slightly more difficult because the working life of females is different than that of males.)

Another method that might be used is to project deaths and retirements separately. Appropriate mortality rates are applied either to members of an occupation as a whole, if the same age composition as for the population in the country is assumed or by age when the age composition of the occupation is available. Retirements are estimated on the basis of the present age composition of the occupation and an estimate of the number who will reach a predetermined or assumed retirement age at each period in the future, after allowance for deaths. This method would be appropriate if the typical retirement age for members of an occupation were known to be different from that of other occupations.

A more refined and simpler technique for estimating deaths and retirements is based on "tables of working life." These tables are based upon, and are similar to, standard life tables. The standard life table is a statistical or actuarial device for summarizing the mortality experience of a population at some particular period of time, i.e., the death rates, by age, over a one-year period.[47] A life table starts with a hypothetical group of persons—usually 100,000 born alive—and follows the group through successive ages as it experiences attrition caused by death. The attrition is estimated by applying the death rates of the real population at each age, to the survivors in the hypothetical population. The tables of working life also follow through successive ages the labor force participation experience of the initial group of 100,000 from 14 years of age on; it shows attrition caused by withdrawals from the labor force as well as by mortality. Tables of working life have been set up on an actuarial basis for both males and females, and account for the effects of deaths and retirements (separately) on the work force at each age level. The tables of working life for women take into account the effects of marital status and presence of children, as well as death and retirement.

Separations from the labor force of young males in the ages in which labor force participation rates increase from year to year include only separations resulting from death,[48] because retirements are not considered significant in these ages.[49] For males age 34 and over, ages in which labor force participation rates are declining from year to year, separations also include retirements, i.e., all separations from the labor force for reasons other than death. Total separations for males at each age, 34 and over, are estimated on the basis of declines in labor force participation as workers grow older, and mortality. Retirements in these ages are based upon declining labor force participation rates in the consecutive age groups, and they can be calculated by subtracting estimated deaths from total separations. The table of working life for males, based on mortality and labor force participation rates for 1960, is included at the end of this chapter.[50]

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[47] The working life tables used in this report are based on the mortality rates and labor force participation rates for 1960.

[48] In 1960, the labor force participation rate for males peaked at age 34. However, the peak could vary from time to time as different observations are made.

[49] The process fails to consider disability retirements or the possibility of any other retirements until age 34, and even then retirements are calculated on the basis of declines in labor force participation rates as workers age. To the extent that such retirements do take place, the procedure results in some understatement of separations, but it is not considered to be significant.

Based on the tables of working life, the probability of total separations from the labor force from one age to any later age can be stated as the ratio of net separations between two age intervals to the number in the labor force in the base year. For young male workers, all separations are deaths, which can be derived by subtracting the number of an original 100,000 males born alive who are still living in year X + 1 from those who were alive in year X. For males 34 years old and over, net separations can be derived by subtracting the number still in the labor force in year X + 1 from the number in the labor force in year X. For the latter example, retirements equal net separations minus deaths. The following tabulation presents a simplified summary of this procedure:

Year of Age	Number Living of 100,00 Born Alive		1-Year Separation Rate (Per 1,000 in Labor Force)		
	Population	Labor Force	Total	Deaths	Retirements
24 . . .	94,717	88,214	[1] 1.8	[1] 1.8	–
25 . . .	94,549	88,912	–	–	–
44 . . .	89,739	86,419	[2] 6.8	[3] 5.8	[4] 1.0
45 . . .	89,221	85,831	–	–	–

[1] $\frac{94{,}717 - 94{,}549}{94{,}717} = \frac{168}{94{,}717} = .0018$

[2] $\frac{86{,}419 - 85{,}831}{86{,}419} = \frac{588}{86{,}419} = .0068$

[3] $\frac{89{,}739 - 89{,}221}{89{,}739} = \frac{518}{89{,}739} = .0058$

[4] .0068 - .0058 = .0010

Source: Tables of Working Life (1960), table 20.

The net separation rate for each single year of age or for a group of years, 5 or 10, for example, can be developed separately by the above technique. These separation rates for each age group then can be applied to the number of persons employed, or in the labor force, in each age group to derive an estimate of the number of persons who will die or retire in the specified period. Table 14 illustrates the age specific separation rates for males, based on the 1960 table of working life, for selected age groups, for selected periods of time.

The procedure illustrated in table 15 estimates the separations of carpenters from 1960 to 1970. No allowance was made for deaths and retirements of new entrants into the carpenter occupation after 1960, since the assumption is that the great majority of new entrants will be young persons with very low mortality rates and few retirements. To the extent that some new entrants during this decade actually will die or retire, the separations calculated are understated.

A similar, but more involved, method can be used to estimate separation rates for females. Once an adult male enters the labor force he usually remains in the labor force until retirement or death. This situation is not true for most women. Women may withdraw temporarily from the labor force because of marriage, presence of children in the home, etc. Many of these women, however, re-enter the labor force in later years after their children reach school age or as a result of their husband's death, etc. Therefore, tables of working life for females take into consideration temporary, as well as permanent withdrawals or retirements from the labor force.

Table 16, derived from tables of working life for women, shows the total separation rates for women by selected age groups and the total number separated in a single year based on these rates and the age distribution of the female labor force in 1960. It also illustrates the number of separations related to marriage, presence of children, death, and age retirement.

Table 17 provides an estimate of the entrance (accessions) of women into the labor force because of age[51], children reaching school age, and loss of husband. If accessions by age are subtracted from total separations by age (table 16) a net separation estimate for women considerably lower than gross separations is derived. For total females in the United States (according to 1960

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[50] The tables of working life for males and females in this report are for the Nation and are for all males and all females. Tables could be developed on an urban-rural or white-nonwhite break if so desired. In addition, tables of working life could be developed for many of the States if the expertise and resources were available to do it. However, for several reasons discussed on p.   States and areas should use the national tables of working life in estimating occupational replacement needs.

[51] The rates include consideration for those women who leave the labor force after marriage and return at a later time.

Table 14. Age Specific Separation Rates for Males, 1960 1/

Age groups	Annual rate	5-year rate	10-year rate	15-year rate
14-19 years	.00128	.00762	.01639	.02519
20-24 years	.00181	.00882	.01778	.03236
25-29 years	.00171	.00903	.02375	.04630
30-34 years	.00227	.01485	.03761	.07165
35-39 years	.00401	.02310	.05766	.12196
40-44 years	.00584	.03537	.10119	.20611
45-49 years	.01031	.06824	.17700	.33842
50-54 years	.02012	.11673	.28998	.65593
55-59 years	.03232	.19614	.61046	.78525
60-64 years	.09625	.51542	.73285	.86952
65 years and over	.13464	.51273	.79540	.93346
35-44 years	.00491	.02917	.07917	.16354
45-54 years	.01504	.09162	.23149	.49157

1/ The age specific separation rates can be developed to agree with any available occupation by age data. For example, census of population occupation by age data are usually in 5-year groupings, but between the ages of 35 and 54 they are in 10-year groupings.

Table 15. Estimated National 1- and 10-year Separations for Male Carpenters

Age group 1960	Employed males 1960	Separations			
		Rate		Number	
		1-year	10-year	1-year	10-year
Total	816,195			18,404	193,220
14-19 years	17,842	.00128	.01639	23	292
20-24 years	53,416	.00181	.01778	95	950
25-29 years	70,481	.00171	.02374	121	1,674
30-34 years	88,470	.00227	.03761	201	3,327
35-44 years	212,568	.00491	.07917	1,044	16,829
45-54 years	193,084	.01504	.23149	2,904	44,697
55-59 years	77,859	.03232	.61046	2,516	47,530
60-64 years	57,358	.09625	.73285	5,521	42,035
65 years and over	45,117	.13464	.79540	6,074	35,886

Source: Age distribution--U.S. Bureau of Census, U.S. Census of Population, 1960. Detailed Characteristics. United States Summary, Final Report PC(1)-1D.

Table 16. Estimated Annual Number and Rate of Separations for the Female Labor Force: 1960

(In thousands)

Age group	Labor force 1960	Total rate	Separation number	Separations related to: Marriage Rate	Marriage Number	Birth of children Rate	Birth of children Number	Death Rate	Death Number	Age Rate	Age Number
Total	23272		1119		84		440		138		457
14-19 years------	2073	.0634	131	.0140	29	.0488	101	.0006	1	(1)	(1)
20-24 years------	2542	.1066	271	.0159	40	.0900	229	.0007	2	(1)	(1)
25-29 years------	1955	.0393	77	.0031	6	.0353	69	.0009	2	(1)	(1)
30-34 years------	2180	.0122	27	.0022	5	.0088	19	.0012	3	(1)	(1)
35-39 years------	2627	.0084	22	.0015	4	.0051	13	.0018	5	(1)	(1)
40-44 years------	2773	.0188	52	(1)	(1)	.0026	7	.0028	8	(1)	(1)
45-49 years------	2879	.0269	78	(1)	(1)	.0006	2	.0042	12	.0134	37
50-54 years------	2349	.0377	89	(1)	(1)	(1)	(1)	.0063	15	.0221	64
55-59 years------	1797	.0645	116	(1)	(1)	(1)	(1)	.0092	17	.0314	74
60-64 years------	1196	.1079	129	(1)	(1)	(1)	(1)	.0143	17	.0553	99
65 years and over----------	901	.1411	127	(1)	(1)	(1)	(1)	.0630	56	.0781	71

1/ Amount not significant.

Note: Totals may not add due to rounding.

Source: Work Life Expectancy and Training Needs of Women, Manpower Report No. 12. U.S. Department of Labor, Manpower Administration.

Table 17. Estimated Annual Number and Rate of Accessions to the Female Labor Force: 1960

(In thousands)

Age group	1960 population	Total accessions Rate	Total accessions Number	Accessions related to: Age Rate	Age Number	Children reaching school age Rate	Children reaching school age Number	Loss of husband Rate	Loss of husband Number
Total	64961		1296		916		309		71
14-19 years----	7934	.0898	712	.0898	712	(1)		(1)	(1)
20-24 years----	5520	.0323	178	.0316	174	.0007	4	(1)	(1)
25-29 years----	5537	.0076	42	.0025	14	.0051	28	(1)	(1)
30-34 years----	6111	.0114	69	.0007	4	.0107	65	(1)	(1)
35-39 years----	6419	.0150	96	.0017	11	.0125	80	.0008	5
40-44 years----	5918	.0144	86	.0001	1	.0126	75	.0017	10
45-49 years----	5554	.0102	57	(1)	(1)	.0077	43	.0025	14
50-54 years----	4932	.0064	32	(1)	(1)	.0028	14	.0036	18
55-59 years----	4411	.0038	16	(1)	(1)	.0001	(1)	.0037	16
60-64 years----	3727	.0021	8	(1)	(1)	(1)	(1)	.0021	8
65 years and over---------	8898	(1)	(1)	(1)	(1)	(1)	(1)	(1)	

1/ Amounts not significant.

Note: Totals may not add due to rounding.

Source: Work Life Expectancy and Training Needs of Women, Manpower Report No. 12, U.S. Department of Labor, Manpower Administration.

information) the total gross separation rate for females would be about 4.8 percent, compared with a net separation rate of about 3.2 percent.[52]

To estimate gross separations for females in a particular occupation, the age specific total separation rates found in table 16 would be applied to the number of workers in each age group. Table 18 illustrates a calculation of the annual gross separations for secretaries, stenographers, and typists–110,758 (or 5.1 percent of the total). If training needs were being calculated instead of manpower requirements, gross separations could be reduced to the extent that qualified secretaries return from outside the labor force by applying the accession rates in table 17 to the approximate age groups, and subtracting the resultant from gross separations.[53]

Separation rates for females have been developed for 1 year only (see tables 16 and 17), due to the characteristics of the participation of females in the labor force. Occupational replacement needs for females for 5, 10, or 15 year age groups can be approximated by multiplying the 1-year rates by the respective number of years; the assumption is that new entrants into the occupation will maintain the 1960 age distribution.

Limitations

Several assumptions underlie the development and use of separation rates. One significant assumption is that mortality trends and retirement patterns do *not* differ by occupation. This statement is not true, however. Differences in the nature of work, the exposure of workers to disabilizing work environments, the coverage and provision of pension plans, the extent of opportunities for employment, and many other factors influence retirement patterns and mortality trends among occupations. For example, the retirement pattern of physicians, who often practice until old age, is very different from that of linemen or roofers, who withdraw from these occupations at a young age because of the physical requirements of these jobs. Similarly, the use of overall separation rates for women assumes that the characteristics of marriage, presence of children in the home, etc., have the same affect on all females regardless of occupation. Women who have the greatest amount of education and, thus, who are concentrated in certain occupations, however, have higher labor force participation rates than the average. Their temporary withdrawal from the labor force, therefore, is much less certain than for women with less education.

The national separation rates are given in appendix A to this volume. For several occupations, the number of separations derived by using these rates has been compared with data from other sources. For example, for several skilled building trades, the U.S. Department of Labor has collected statistics on the number of journeymen per 1,000 who become unavailable for work because of death, permanent disability, or retirement during a 12-month period. In general, the average rates based on these surveys were very similar to the computed death and retirement rates derived by using tables of working life. Rates for metal trades occupations developed in a 1957 study of the New York State Department of Labor were very similar to those computed by the methods described in this chapter.[54] On the basis of these evaluations, these rates are quite representative of the true rates for most occupations. In the absence of more comprehensive data for individual occupations, the tables of working life provide a systematic method for obtaining an estimate of the general magnitude of separations resulting from deaths and retirements. Regional analysts, however, should

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[52]

Gross Separations *minus* (thousands)	Accessions *equals* (thousands)	Net Separations (thousands)
84 (marriage)	71 (loss of husband)	13
440 (birth of children)	309 (children reaching school age)	131
595 (deaths and retirements)		
1119 Total	380 Total	739 Total

The total separation rate for females is computed as follows:

$$\frac{\text{total number of separations}}{\text{total labor force}} \quad \frac{1,119}{23,272} = .0481$$

The net separation rate is computed as follows:

$$\frac{\text{net number of separations}}{\text{total labor force}} \quad \frac{739}{23,272} = .0318$$

[53] From a training point of view, however, women who have been out of the labor force for several years may need significant refresher training before taking over the duties of an occupation at which they were employed 10 to 15 years before. Moreover, this adjustment assumes that female secretaries, stenographers, and typists have the same temporary retirement patterns as female workers as a whole.

[54] *Manpower in Selected Metal Crafts, New York State,* New York State Department of Labor, Division of Research and Statistics, Publication No. B-107, 1959.

adjust separation rates judgmentally, however, if retirement patterns (or mortality rates) of particular occupations are known to differ from that of the general population in a State or area.

Another limitation of the overall technique relates to the timeliness of age distribution data for occupations. A comprehensive source of this data is the decennial census of population—the most recent was for the year 1960. The age distribution of occupations changes over time, however, and to the extent that the 1960 age distribution does not reflect the current or anticipated age distribution of an occupation, the estimate of employment requirements will be affected. Regional analysts may want to modify separation rates somewhat to take account of recent apparent changes in the age distribution of an occupation. For example, if an occupation has been growing very rapidly in a State or area since the period for which age distribution data is available, perhaps the derived separations should be lowered slightly to take account of the influx of young people into the occupation. Conversely, regional analysts may increase the derived separations slightly if an occupation has shown little growth or decline in the period since comprehensive age distribution data become available.

How to develop separation rates for a State or area

States and areas can develop in several ways estimates of manpower requirements arising from the need to replace experienced workers who die, retire, or who otherwise withdraw from the labor force over the projection period. The simplest way is to apply the national rates in appendix A for each occupation to the midpoint of the appropriate occupational projection for the State or area. The assumptions underlying the use of national separation rates for a State or area are: (1) The age distribution for the occupation in a State or area is the same as in the Nation, and (2) the mortality trends and retirement patterns by age within the State or area are the same as in the Nation. The latter assumption is more valid than the former. Mortality trends by age are probably quite similar across the Nation. For example, life insurance companies use one set of life tables for all sections of the country. Although retirement patterns (labor force participation rates) do vary somewhat across the country because of, for example, opportunities for employment and local customs, in general, participation rates do not differ greatly, (see tabulation above).

Labor Force Participation Rates by Age and Sex, 1960

Area	Males Total 144	 14 to 24	 25 to 54	 55 and over	Females Total 144	 14 to 24	 25 to 54	 55 and over
United States.	77.4	57.1	94.7	57.3	34.5	32.5	41.4	22.1
New York. . .	78.1	52.6	94.8	61.7	37.0	37.4	43.2	24.9
California . . .	79.5	63.0	95.1	56.2	36.1	32.1	43.6	22.8

Source: "Labor Force Projections By State, 1970 and 1980," Special Labor Force Report No. 87, Reprinted from the "Monthly Labor Review," October 1967, U.S. Department of Labor, Bureau of Labor Statistics.

In terms of the first assumption, the age distribution of an occupation probably differs somewhat between States. State and area analysts who are interested in estimating local separations by using the national rates in appendix A should compare the national age distribution for an occupation with the age distribution in the State, and perhaps adjust the rate up or down slightly on the basis of the comparison. For example, if the ages of plumbers in Nebraska in 1960 were generally older than in the Nation, perhaps for Nebraska a separation rate of 2.1 percent instead of a national rate of 1.8 percent might be used.

A *second* technique, recommended by the Bureau of Labor Statistics, is to use the age-specific rates derived from the national tables of working life, table *14* for males and table *16* for females, and apply them to the age distribution of occupations in the State. This technique takes account of differences in the age distributions between States and the Nation for occupations. Table 19 below provides an example of applying the national annual separation rate for males to the age distribution of carpenters in New York and California. Although there were about one-quarter more carpenters in California than in New York, only about one-fourteenth more job openings would be expected to arise annually from deaths and retirements of employed carpenters in California than in New York. The employed carpenters in California tend to be younger than those in New York (or in the Nation) and this fact is indicated in the derived separation rates.

United States $\frac{18{,}404}{816{,}195} = 2.25$

New York $\frac{1{,}406}{57{,}951} = 2.43$

California $\frac{1{,}500}{73{,}797} = 2.03$

Table 18. Estimated 1-year Separations of Female Secretaries, Stenographers, and Typists

Age group	Employed females 1960	Separation rates	Number of separations
Total------------------------	2,178,641		110,758
14-19 years----------------------	235,407	.0634	14,925
20-24 years----------------------	456,140	.1066	48,625
25-29 years----------------------	256,264	.0393	10,071
30-34 years----------------------	226,278	.0122	2,761
35-44 years----------------------	470,311	.0137	6,443
45-54 years----------------------	344,900	.0319	11,002
55-59 years----------------------	104,657	.0645	6,750
60-64 years----------------------	53,237	.1079	5,744
65 years and over----------------	31,447	.1411	4,437

Table 19. Estimated 1-Year Separations for Male Carpenters, New York and California

Age group 1960	Employed males 1960		Separation rate	Number of separations	
	New York	California		New York	California
Total------------------	57,951	73,797		1,406	1,500
14-19 years-----------------	872	1,406	.00128	1	2
20-24 years-----------------	3,484	5,204	.00181	6	9
25-29 years-----------------	5,627	6,536	.00171	10	11
30-34 years-----------------	6,961	7,925	.00227	16	18
35-44 years-----------------	14,387	20,904	.00491	71	103
45-54 years-----------------	12,338	17,480	.01504	186	263
55-59 years-----------------	6,064	6,474	.03232	196	209
60-64 years-----------------	4,843	4,551	.09625	466	438
65 years and over-----------	3,375	3,317	.13464	454	447

Sources: Age distribution - U.S. Bureau of Census, U.S. Census of Population 1960, Detailed Characteristics, New York, Final Report PC(1)-34D, and California, Final Report PC(1)-6D.

States and areas that have the time, the resources, the expertise, and the data sources can develop their own tables of working life. From these tables, age specific separation rates can be computed similar to those developed by BLS for the Nation and described above. This technique is involved technically and the derived rates for States probably would not add the degree of precision to the estimate of manpower requirements worth the expenditure of time and resources. Nevertheless, decisions about such computations should be made by the respective State or area analysts who are familiar with local data sources and the technical and financial resources available.

Transfers to Other Occupations

Transfer from one occupation to another occupation is an additional factor that can be considered when estimates of future manpower or training requirements are being developed. In some occupations, the transfer rate may be as high as the death and retirement rate.

In general, workers tend to move from less skilled to more skilled occupations. For example, a factory operator may become a foreman, and move from a semiskilled to a skilled classification; similarly, a mechanic may transfer to a technician job, and shift from the craftsmen to the professional, technical, and kindred workers classification. This type of transfer is usually the result of long experience, often supplemented by additional training.

Unfortunately, comprehensive data are not available on the rate of transfers between occupations. Most of the data available stems from selected sample studies of work histories collected from individuals. One such study, *Postcensal Study of Professional and Technical Personnel,* followed up 2 years after the 1960 census persons classified in science, engineering, and other professional and technical occupations. The purpose of the study was to determine the proportion of workers who changed occupations over the 2-year period. For example, the annual transfer rate for engineers was estimated at 1.6 percent, for life scientists, 2.6 percent, for technicians, 3 percent.

Another study, *Career Patterns of Former Apprentices,* (U.S. Department of Labor, Bulletin T-147, March 1959), provides information on occupational transfers for several craft occupations. For example, more than 10 percent of the apprentice carpenters who completed the apprenticeship program in 1950 were in other occupations in 1956. Moreover, estimates of losses to teaching occupations have been developed from surveys prepared by the U.S. Office of Education. Two detailed studies of teacher turnover (1957-58 and 1959-60) determined the number of teachers who left their positions between the beginning of one school year and the next.[55] The separation rate for elementary school teachers based on this study was 8.1 percent. About one-half of these separations were deaths and withdrawals from the labor force, and the remainder were transfers to other occupations.

A monumental study[56] of mobility was made by the Social Science Research Council. Ten-year work histories were collected from workers in sample households in each of 6 large cities. In all, 13,000 work history schedules were collected. Each job held by the workers were classified by occupation and occupation group. Thus, for each person, one could obtain the number of job changes and occupational changes made. By combining the data, a measure of the incidence and the pattern of movement out of an occupation was obtained.

Several other attempts have been made to measure the rate of movement out of an occupation. Two studies analyzed net occupational mobility[57] by applying cohort analysis to the data from successive censuses of population supplemented by the monthly labor force survey.[58] "Model Cohort Work Experience Tables" were designed for major occupational groups. The primary purpose of the study was to determine (1) the net occupational mobility that actually occurred; (2) the occupational distribution of new entrances into the labor force; and (3) the occupational distribution of retirements from the labor force. The net mobility estimate was the difference between the number of persons moving into and out of an occupation. Recently, work has proceeded on a white-nonwhite break between 1950 and 1965.

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[55] *Teacher Turnover in the Public Schools, 1957-58,* U.S. Office of Education, OE-23002, Circular 608, 1959, and *Teacher Turnover in Public Elementary and Secondary Schools, 1959-60,* OE-23002-60, Circular 675, 1963.

[56] Gladys L. Palmer, Labor Mobility in 6 Cities, New York, Social Science Research Council, 1954.

[57] "A Note on Occupational Mobility for White and Nonwhite Males, 1950 to 1965," A. J. Jaffe and J. B. Gordon, *The New York Statistician,* December 1966. This study defines net mobility as the following: "The estimates of net occupational movement were derived by following an age cohort of men from one census period to another. For example, let us suppose that there were 1,000 men aged 30 to 34 years in service occupations in 1950. By 1960 these men were aged 40 to 44. Let us assume that 50 of these men have died, leaving 950 alive. If we find that the 1960 census reports 1,100 men in service occupations aged 40 to 44, we assume that there was a net in-movement of 150 men into this occupation group (1,100 - 950 = 150)."

[58] "Occupational Mobility in the United States," A. J. Jaffe and R. O. Carleton, New York, King Crown Press, 1954 and "A Note on Occupational Mobility for White and Nonwhite Males, 1950 to 1965," A. J. Jaffe and J. B. Gordon, *The New York Statistician,* December 1966.

Recently, the Bureau of Labor Statistics undertook a study of occupational mobility. This study adds to an earlier one made on the shifts of workers from one employer to another during 1961 that yielded some valuable insights into the mobility of men and women by age and occupational group. The new study focuses on the occupational shifts of workers in major occupational groups between January 1965 and January 1966.[59]

Although little comprehensive data is available to estimate changes in occupational requirements due to transfers between occupations, this weakness in the technique is not considered greatly significant for the planning of education and training programs. Generally, estimates of occupational requirements based on expected growth and replacements are adequate for most planning purposes. Most States or areas do not have the available resources to train workers to fill all the anticipated job openings in occupations. Moreover, to do so probably would be wasteful because many workers pick up an occupation informally, for example, and learn by observing or working at various aspects of a trade until most or all have been learned. Indications are that many workers have learned the skills of their trade informally.[60] The fact that workers are not trained to fill all anticipated job openings provides some flexibility in the future supply of workers to be filled by the transfer of workers between occupations. There are other ways also by which employers can overcome a shortage of skills. Depending upon the extent of under supply in an occupation, local employers will tend to find ways to "make do" with the available skills through, for example, in plant education, job redesign and the use of job aides, general upgrading, reorganization of work, and hiring outside the geographic area.

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[59] *"Occupational Mobility of Employed Workers," Special Labor Force Report No. 84 reprinted from the Monthly Labor Review*, June 1967, U.S. Department of Labor, Bureau of Labor Statistics.

[60] See, *Formal Occupational Training of Adult Workers*, Manpower Automation Research Monograph No. 2, U.S. Department of Labor, Manpower Administration, Office of Manpower, Automation and Training, December 1964.

Table 20. Table of Working Life, Males, 1960

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Years of age	Number living of 100,000 born alive			Accessions to the labor force (per 1,000 in population)	Separations from the labor force (per 1,000 in labor force)			Average number of remaining years of	
	In Population	In labor force			Due to all causes	Due to Death	Due to retirement	Life	Labor force participation
		Number	Percent of population						
x to x+1	l_x	L_{wx}	w_x	$1000\ A_x$	$1000\ Q_x^s$	$1000\ Q_x^d$	$1000\ Q_x^r$	$\overset{o}{e}_x$	$\overset{o}{e}w_x$
	(In year of age)			(Between years of age)				(At beginning of year of age)	
14 years------	96,145	14,806	15.4	52.0	.9	.9	--	55.4	48.4
15 years------	96,060	19,788	20.6	119.9	1.0	1.0	--	54.4	47.4
16 years------	95,960	31,283	32.6	143.8	1.2	1.2	--	53.5	46.4
17 years------	95,842	45,046	47.0	177.8	1.4	1.4	--	52.5	45.5
18 years------	95,710	62,020	64.8	116.8	1.5	1.5	--	51.6	44.5
19 years------	95,566	73,108	76.5	63.9	1.6	1.6	--	50.7	43.6
20 years------	95,411	79,096	82.9	34.0	1.8	1.8	--	49.8	42.7
21 years------	95,244	82,196	86.3	26.0	1.9	1.9	--	48.8	41.8
22 years------	95,069	84,516	88.9	18.9	1.8	1.8	--	47.9	40.8
23 years------	94,892	86,162	90.8	13.9	1.8	1.8	--	47.0	39.9
24 years------	94,717	87,329	92.2	11.0	1.8	1.8	--	46.1	39.0
25 years------	94,549	88,214	93.3	9.0	1.7	1.7	--	45.2	38.0
26 years------	94,386	88,912	94.2	8.0	1.7	1.7	--	44.3	37.1
27 years------	94,227	89,516	95.0	7.0	1.7	1.7	--	43.4	36.2
28 years------	94,069	90,024	95.7	6.0	1.7	1.7	--	42.4	35.2
29 years------	93,908	90,433	96.3	5.0	1.8	1.8	--	41.5	34.3
30 years------	93,741	90,741	96.8	2.0	1.9	1.9	--	40.6	33.3
31 years------	93,567	90,760	97.0	1.0	1.9	1.9	--	39.6	32.4
32 years------	93,386	90,678	97.1	1.0	2.0	2.0	--	38.7	31.5
33 years------	93,195	90,586	97.2	.6	2.2	2.2	--	37.8	30.5
34 years------	92,993	90,446	97.3	--	3.0	2.3	.7	36.9	29.6
35 years------	92,777	90,179	97.2	--	3.5	2.5	1.0	35.9	28.7
36 years------	92,546	89,862	97.1	--	3.7	2.7	1.0	35.0	27.8
37 years------	92,297	89,528	97.0	--	4.0	3.0	1.0	34.1	26.9
38 years------	92,024	89,171	96.9	--	4.3	3.2	1.1	33.2	26.0
39 years------	91,727	88,792	96.8	--	4.6	3.6	1.0	32.3	25.1
40 years------	91,401	88,385	96.7	--	5.0	3.9	1.1	31.4	24.2
41 years------	91,042	87,947	96.6	--	5.4	4.3	1.1	30.5	23.3
42 years------	90,647	87,474	96.5	--	5.8	4.8	1.0	29.7	22.4
43 years------	90,215	86,967	96.4	--	6.3	5.3	1.0	28.8	21.5
44 years------	89,739	86,419	96.3	--	6.8	5.8	1.0	27.9	20.7
45 years------	89,221	85,831	96.2	--	7.4	6.3	1.1	27.1	19.8

Table 20. Table of Working Life, Males, 1960--Continued

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Years of age	Number living of 100,000 born alive			Accessions to the labor force (per 1,000 in population)	Separations from the labor force (per 1,000 in labor force)			Average number of remaining years of	
	In population	In labor force			Due to all causes	Due to Death	Due to retirement	Life	Labor force participation
		Number	Percent of population						
x to x+1	l_x	L_{wx}	w_x	1000 A_x	1000 Q^s_x	1000 Q^d_x	1000 Q^r_x	$\overset{o}{e}_x$	$\overset{o}{ew}_x$
	(In year of age)			(Between years of age)				(At beginning of year of age)	
46 years------	88,655	85,197	96.1	--	8.6	7.0	1.6	26.3	18.9
47 years------	88,033	84,463	95.9	--	10.1	7.7	2.4	25.4	18.1
48 years------	87,351	83,612	95.7	--	11.8	8.7	3.1	24.6	17.2
49 years------	86,595	82,625	95.4	--	13.8	9.6	4.2	23.8	16.4
50 years------	85,762	81,484	95.0	--	16.0	10.7	5.3	23.0	15.6
51 years------	84,847	80,180	94.5	--	18.1	11.7	6.4	22.2	14.9
52 years------	83,852	78,727	93.9	--	20.2	12.8	7.4	21.5	14.1
53 years------	82,778	77,140	93.2	--	22.3	13.8	8.5	20.8	13.4
54 years------	81,630	75,420	92.4	--	24.4	14.8	9.6	20.0	12.7
55 years------	80,411	73,576	91.5	--	26.6	16.0	10.6	19.3	11.9
56 years------	79,117	71,621	90.5	--	28.9	17.3	11.6	18.6	11.2
57 years------	77,742	69,549	89.5	--	31.6	18.8	12.8	17.9	10.5
58 years------	76,272	67,348	88.3	--	35.0	20.5	14.5	17.2	9.9
59 years------	74,700	64,989	87.0	--	40.5	22.3	18.2	16.6	9.2
60 years------	73,019	62,358	85.4	--	47.3	24.2	23.1	15.9	8.5
61 years------	71,230	59,406	83.4	--	53.5	26.2	27.3	15.3	7.9
62 years------	69,334	56,230	81.1	--	61.1	28.3	32.8	14.7	7.3
63 years------	67,339	52,794	78.4	--	86.7	30.2	56.5	14.1	6.7
64 years------	65,246	48,217	73.9	--	263.7	29.6	234.1	13.5	6.2
65 years------	63,062	35,504	56.3	--	169.6	33.6	136.0	13.0	6.3
66 years------	60,789	29,483	48.5	--	122.0	37.2	84.8	12.4	7.0
67 years------	58,433	25,886	44.3	--	97.9	40.4	57.5	11.9	7.2
68 years------	56,002	23,353	41.7	--	101.8	43.3	58.5	11.3	7.0
69 years------	53,507	20,975	39.2	--	106.0	46.3	59.7	10.8	6.7
70 years------	50,955	18,751	36.8	--	110.3	49.5	60.8	10.3	6.5
71 years------	48,352	16,681	34.5	--	115.0	53.0	62.0	9.8	6.2
72 years------	45,708	14,764	32.3	--	120.2	56.8	63.4	9.4	5.9
73 years------	43,025	12,990	30.2	--	126.2	60.9	65.3	8.9	5.6
74 years------	40,313	11,349	28.2	--	132.9	65.5	67.4	8.4	5.4
75 years------	37,580	9,841	26.2	--	141.6	70.3	71.3	8.0	5.1
76 years------	34,839	8,448	24.2	--	151.8	75.6	76.2	7.6	4.8
77 years------	32,100	7,166	22.3	--	162.9	81.6	81.3	7.1	4.6
78 years------	29,369	5,999	20.4	--	174.9	88.4	86.5	6.7	4.3

Table 20. Table of Working Life, Males, 1960--Continued

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Years of age	Number living of 100,000 born alive			Accessions to the labor force (per 1,000 in population)	Separations from the labor force (per 1,000 in labor force)			Average number of remaining years of	
	In population	In labor force			Due to all Causes	Due to Death	Due to retirement	Life	Labor force participation
		Number	Percent of population						
x to x+1	l_x	L_{wx}	w_x	1000 A_x	1000 Q_x^s	1000 Q_x^d	1000 Q_x^r	$\overset{o}{e}x$	$\overset{o}{e}w_x$
	(In year of age)			(Between years of age)				(At beginning of year of age)	
79 years------	26,654	4,950	18.6	--	188.1	96.5	91.6	6.3	4.1
80 years------	23,959	4,019	16.8	--	203.3	105.5	97.8	6.0	3.9
81 years------	21,301	3,202	15.0	--	220.5	115.2	105.3	5.6	3.7
82 years------	18,711	2,496	13.3	--	238.8	124.5	114.3	5.3	3.6
83 years------	16,241	1,900	11.7	--	253.7	132.9	120.8	5.0	3.6
84 years------	13,945	1,418	10.2	--	265.2	142.2	123.0	4.7	3.6
85+ years-----	56,390	4,511	8.0	--	--	--	--	4.[illegible]	3.7

Source: Based on unpublished data which updates The Length of Working Life for Males, 1900-60, Manpower Report No. 8, U.S. Department of Labor, Manpower Administration.

APPRAISING THE ADEQUACY OF SUPPLY IN INDIVIDUAL OCCUPATIONS

The preceding chapters of this volume have been concerned with future manpower requirements. In planning occupational training programs, another factor also should be considered–the adequacy of supply. Only by considering both demand and supply together can questions be resolved as to whether or not programs should be developed to expand training in a particular occupation.

The supply of workers in a particular occupation is not static, as a continuous flow of workers into and out of an occupation takes place. Entrants take into account those coming from the following sources: Persons entering directly after completion of a training program designed to prepare them for that occupation; persons entering directly after completion of a training program designed to prepare persons for some other occupation; persons other than students who are not in the civilian labor force, including housewives, retired persons, and those in the Armed Forces; persons employed in other occupations; and immigrants. In a State or specific locality, the migration of persons from other areas might be especially significant. Occupational losses include an estimate of the number of workers in the occupation who will die or retire during the projection period, those who will leave the civilian labor force for some other reason, those who will transfer to other occupations, and those who will emigrate. In the analysis of occupational supply in a State or specific locality, migration to other areas also must be considered.

The flow of manpower into and out of an occupation is illustrated in chart 3.

Several approaches may be used to evaluate the adequacy of supply in an occupation. One approach is to compare the annual number of new entrants in an occupation in recent periods with the number of new workers that will be needed annually in a future period for growth of employment requirements and for replacements. This approach provides an indication as to how much training activities must be expanded to meet estimated or assumed manpower requirements in the occupation. This type of analysis is illustrated in a recent study of health manpower conducted by the Bureau of Labor Statistics, in which the following analysis was made in appraising the adequacy of the output of United States dental schools. The analysis of manpower requirements resulting from employment growth and replacement needs indicated an annual average need for about 5,300 new dentists between 1966 and 1975. Over the 1960-66 period, about 3,200 persons graduated from dental schools each year. On the basis of follow-up studies of new dental graduates, assumptions were made that nearly all of the new dentists would stay in the field[61] and that very few other additions to the supply during this 9-year period would take place, because recent experience indicated only a small number of dentists immigrate to the United States and very few persons who qualify as dentists return to this occupation from other fields or from outside of the labor force.[62] The conclusions that might be reached by comparing the current output of dental schools with the number of new dentists needed each year would indicate that the annual number of dental graduates would have to be increased by about two-fifths, from about 3,200 to about 5,300, in the 1966-75 period. In using this approach for area manpower analysis, the effect of migration into the area from other parts of the country would have to be evaluated if migration out of the area were included in the estimate of needs. (See Chapter 2 for a discussion of manpower requirements resulting from migration.)

Another approach for determining whether or not, or how much, training programs should be expanded is to appraise current and recent supply-demand relationships to estimate the incidence of "shortages." Next, an appraisal of the expected growth in requirements relative to past employment increases is made. If, for example, shortages have been and are occurring, and the growth rate in employment requirements is accelerating, one could assume reasonably that the rate of growth in training also must be accelerated.

Another approach that may be useful for some planning purposes is to estimate the supply that might be available at a future target year under specific assumptions about the future. The resulting estimate of supply may be compared with target year projections of requirements to illustrate target-year supply-demand conditions, if steps are not taken through vocational guidance or other methods to adjust supply to prospective demand.

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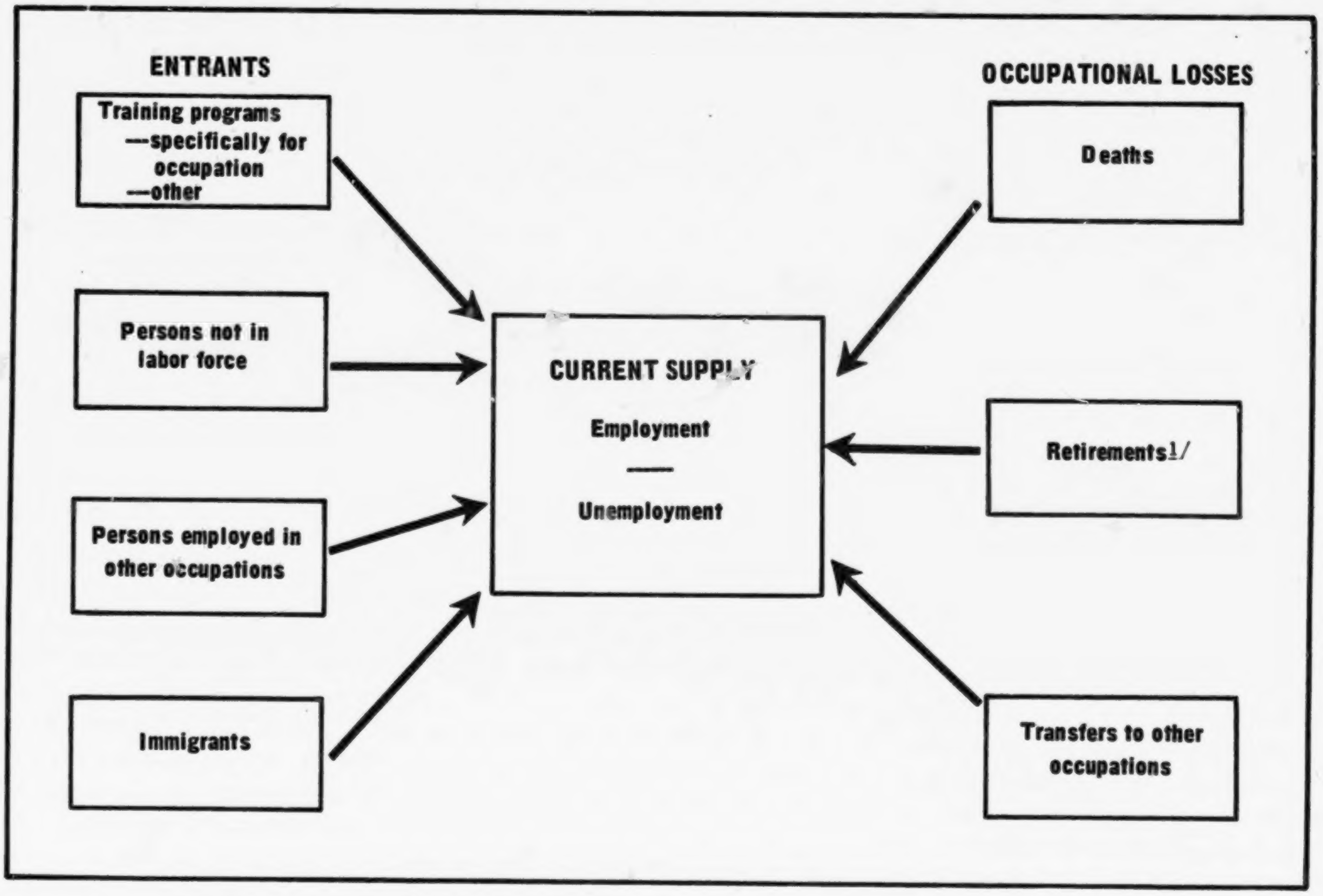
[61] This is not true in many occupations, as discussed later in this Chapter.

[62] In other fields such as physicians, immigrants have made up a significant proportion of annual new entrants into the occupation in recent periods. In an occupation such as teaching, re-entrants into the labor force, especially women who had withdrawn because of family responsibilities, make up a large percent of additions to supply each year.

Chart 3.

THE STREAM OF MANPOWER INTO AND OUT OF AN OCCUPATION


ENTRANTS
Training programs —specifically for occupation —other
Persons not in labor force
Persons employed in other occupations
Immigrants
CURRENT SUPPLY
Employment
Unemployment
OCCUPATIONAL LOSSES
Deaths
Retirements1/
Transfers to other occupations

1/ Includes all workers who leave the civilian labor force or who emigrate.

The procedure which is followed in developing supply projections consists of three basic steps. First, a current supply estimate is established as the base of the projection. Then, the annual number of entrants from all sources is developed for the period that the projection is to cover. Third, the base current supply is aggregated with estimates of the annual number of entrants and annual occupational losses are deducted.

The use of this method is limited, however, to a relatively few occupations. In most occupations estimates of annual new entrants cannot be developed, primarily because information on numbers entering from the various sources are not available. For many occupations, reliable information is not even available on how workers generally become qualified for their jobs. For example, among most craftsmen occupations—fields for which long periods of training are generally required—only a relatively small proportion are trained through apprenticeship or other formal training programs for which statistics on completions are available. Many craftsmen learn their jobs by informal on-the-job training. Other persons, by moving from one semiskilled job to another over a period of years, acquire knowledge and skills sufficient to become skilled workers. Others begin learning a skilled trade in vocational, trade, or technical schools. Similarly, quantitative estimates of the supply in an occupation such as typist are extremely difficult to obtain, as thousands of people learn how to type each year in schools or at home. The occupations for which sufficient information is available to develop a projected supply estimate are primarily those in the professional and technical major occupational group that have a specific training requirement. Most are in the scientific, engineering, health, and teaching occupations.

This latter method is the most detailed of the procedures to use in analyzing supply and the following detailed description of the method of developing target-year supply projections is presented to illustrate the many concepts and factors that must be considered. Understanding these concepts is also desirable for the other types of supply analysis described above. To make the description more realistic, national supply projections for engineers and several science fields are presented.

Methods for Projecting Labor Supply in a Specific Occupation

The inflows and outflows to an occupation is illustrated in the following formula which indicates the change in supply from period N to N+1:

Supply in the future period equals Current supply plus

Entrants during period minus Occupation losses during period

$$(E+UE)_{N+1} = (E+UE)_{N} + TP_s+TP_o+OC+NLF+I_{N\rightarrow N+1} - (D+R+T+OL)_{N\rightarrow N+1}$$

Where E = Employment
UE = Unemployed workers seeking work in occupation
TP_s = Entrants from training programs designed to prepare workers specifically for the occupation
TP_o = Entrants from training programs designed to prepare workers for other occupations
OC = Entrants from other occupations
NLF = Entrants from persons not in the labor force
I = Immigrants entering the occupation
D = Deaths
R = Retirements
T = Transfers
OL = Other losses (e.g. emigrants)

The following is a discussion of each of the steps involved in using this formula to project supply in period N+1; the inflows and outflows to engineering and science fields will serve as an illustration.

Current Supply. Current supply, when defined as the sum of the employed and unemployed, is different from "potential supply," which would include all workers who could perform that type of work regardless of their decision to work in another occupation or not to work at all. Many people possess more than one skill and will work at more than one occupation as circumstances dictate or opportunities allow. This statement is particularly true of occupations for which the skill requirements are relatively low; but, even at the highest levels of skill and training, many individuals' qualifications permit them to shift from one occupation to another. Thus, in the United States, even in the sciences, where specific educational requirements are among the highest in the occupational hierarchy, an appreciable amount of shifting between occupations occurs.

In general, because of the multiplicity of skills possessed by individuals, the number of persons qualified for employment in any occupation will always be larger than the number actually employed. Many of those qualified, but not currently employed in an occupation, are employed in other occupations, and some are persons not economically active, e.g., retired persons or women who have temporarily withdrawn from the labor force to take care of their families. The labor supply for an occupation, therefore, may be viewed as elastic to some extent. When earnings or other inducements for employment (e.g., location, education paid for by employer, other fringe benefits, willingness of employers to accept part-time workers, etc.) in the occupation are high relative to those in other occupations or to past periods, some additional workers may be drawn in; the opposite situation may take place when earnings, opportunities, or other inducements are low. Thus, some assumptions or indications of the demand for the occupation, both overall and relative to competing occupations, are needed in developing a supply projection for an occupation.

An estimate of the employment of engineers and scientists in the United States in 1966 is shown in table 21. The estimates were developed independently for engineers and scientists employed in six major sectors of the economy–private industry, colleges and universities, Federal Government, State governments, local governments and nonprofit organizations. To the employment estimates can be added an estimate of unemployed scientists and engineers.[63]

New Entrants. College graduates from United States schools will make up, by far, the largest portion of new entrants into science and engineering positions in the United States. The estimates of entrants are based on three factors: (1) Projections of new college graduates in each field; (2) estimates of the proportion of new college graduates in each degree field who enter the field

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[63] Based on unpublished data from the Current Population Survey. The unemployment rate for scientists and engineers was estimated at about 1 percent in 1965.

Table 21. Estimated Employment of Scientists and Engineers by Occupation and Broad Industry Group, 1966

(In thousands)

Industry group	Scientists and engineers	Engineers	Scientists			
			Total	Physical scientists	Life scientists	Mathematicians
All industries-----	1412.2	996.0	416.7	213.0	150.6	51.8
Private industry--------	1012.2	816.8	195.5	137.1	27.1	29.7
Federal government------	134.1	80.1	54.0	25.5	24.5	4.1
State governments-------	51.7	36.0	15.9	2.8	12.9	.4
Local governments-------	33.8	28.0	5.7	1.4	4.2	.1
Colleges and universities----------	180.7	35.1	145.6	46.2	81.9	17.5

immediately after receiving their degree, and (3) estimates of the proportion of these workers who are not employed in the field at the time they received their degrees.

Projections of graduates in individual fields of study have been made by the Office of Education on the basis of past trends in the proportion of the total school population, for males and females separately, who are enrolled or graduated in each course.[64] These projections assume that the propensity of students to enroll in the various courses will follow past trends and will not be affected by changes in student vocational preferences resulting from vocational guidance or the publication of information on employment opportunities. They also assume that schools will continue to expand their facilities for teaching each course in line with past trends, and will not take into account, any more than in the past, projections of manpower needs in the various occupations.

Not all graduates obtain jobs in the field of their training. Some mathematics graduates, for example, obtain positions in engineering, and conversely, some persons with degrees in engineering follow a career in mathematics. Many graduates become teachers in secondary schools, particularly in science and mathematics. Some graduates with bachelor's degrees begin professional training in other fields such as medicine or business management. Some graduates with degrees in science or engineering take jobs that do not directly use their technical knowledge, e.g., clerical, sales, etc. Many others continue to attend school. Therefore, estimates of the proportion of students in each degree field who will enter the field in which they were trained immediately after graduation are necessary. Such estimates can be prepared by analyzing the type of work obtained by college graduating classes in the past.[65] Table 22 shows illustrative estimates of the proportion of science and engineering graduates by degree level entering their field of training directly after receiving their degree.

New college graduates who enter the field for which they were trained are not the only source of new college graduates entering a particular science or engineering specialty. Each year the supply of scientists is augmented by some engineering graduates and the supply of engineers by some science graduates. Furthermore, some new college graduates in fields other than science or engineering, such as education, etc., enter science and engineering occupations. Estimates of the number of persons who will enter engineering and each science occupation with degrees in fields other than in the occupation that they enter can be developed also from followup studies of college graduating classes, which reveal the type of work obtained compared with the college majors. For example, estimates in recent years indicate that in the United States for every 100 persons with bachelor's degrees in engineering who have become engineers upon graduation, about 20 persons enter engineering who had received college degrees in other fields. Similarly, for every 100 persons with a bachelor's degree in chemistry who become chemists, 25 persons enter the field with college degrees in other fields.

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[64] See *Projections of Educational Statistics to 1975-76,* 1966 Edition, U.S. Department of Health, Education and Welfare; OE-10030-66 for a detailed description of the method used to project total enrollments in institutions of higher education; first-time degree credit enrollment; bachelor and first professional degrees (men and women separately), total and by field; and masters' and doctors' degrees, total and by field.

[65] Two major follow-up studies in the United States provide data in developing such estimates: *Two Years After the College Degree–Work and Further Study Patterns,* NSF 63-26, and *Education and Employment Specialization in 1952 of June 1951 College Graduates,* National Science Foundation, 1954.

Table 22. Proportion of Graduates Entering Their Field of Training, by Degree Level

Field	BA recipients	MA recipients	PH.D. recipients
Engineering	80	84	97
Chemistry	34	68	95
Physics	30	61	95
Earth science	25	52	95
Life science	20	51	95
Mathematics	19	47	95
Physical science (all other)	15	35	95

Source: Estimates based on data presented in Two Years After the College Degree - Work and Further Study Patterns (NSF 63-26). The proportions for Ph. D. recipients are based on analysis of several studies of the educational makeup of science and engineering professions.

A final step in preparing estimates of new entrants with United States college degrees was to determine the proportion of the graduates who were not employed already in the occupation at the time they received their degree. A large percentage of persons receiving their master's and Ph.D. degrees already have jobs in the field for which they are studying while they attend school. Available data indicate that about four-fifths of all new Ph.D. graduates in engineering and all science fields, except chemistry (60 percent), already were employed in their field when they received their degrees[66]. Similarly, estimates of new master's degree recipients who were employed in their fields at the time they received their degrees ranged from one-half to four-fifths among the various fields. Moreover, some new engineering bachelors' degrees graduates already were employed in engineering and received other degrees by attending school parttime.

Other Entrants. In addition to new United States college graduates, significant numbers of persons enter scientific and engineering professions from other areas. Many technicians and other persons without college degrees are upgraded to science and engineering positions; workers in other occupations who have college degrees transfer to science or engineering; many persons transfer from one science field to another; and others enter from outside the labor force. In addition, immigrants add to the supply of scientists and engineers. In any State or specific area of the country, persons migrating from other areas may be a major source of new entrants. One might project the number of entrants from each of these sources by examining past data and considering possible future developments. The number of scientists and engineers immigrating into the United States in past years are available and might be projected, if changes in immigration regulations and other factors are considered. Information on upgrading of technicians to engineering or science jobs are available from follow-up studies.[67] Alternatively, one could develop estimates of all new entrants, except new college graduates, as a group, from past data.[68]

Losses to Supply. In projecting the supply of workers to a future year, an estimate is needed of losses both from supply in the base year and from new entrants, resulting from deaths, retirements, persons leaving the labor force for other reasons, transfers out of the occupation; and for a specific area, persons migrating to other areas. Several methods of estimating such losses are described in Chapter 2.

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[66] See *Doctorate Production of United States Universities 1920-1962,* National Academy of Science, National Research Council publication 1142.

[67] *Postcensal Study of Professional and Technical Personnel*—persons who were reported as technicians in the 1960 decennial census were asked their occupation in 1962. A discussion of the amount of upgrading to science and engineering occupations is included in *Technician Manpower: Requirements, Resources and Training Needs.* (BLS Bulletin 1512.)

[68] For example, in engineering, to develop estimates of new entrants other than new United States college graduates from 1950 to 1963, an analysis first was made of the growth in the occupation over that period; of the total number of entrants during that period with new United States college degrees; and appropriate death, retirement, and transfer losses for the 1950-63 period to these groups. The sum of both workers employed in 1950 still in the occupation in 1963 and 1950-63 entrants with college degrees still remaining in the occupation in 1963 was deducted from the 1963 employment. The remainder was estimated to be the total number in the occupation who entered without United States college degrees over the 1950-63 period and still were employed.

Appendix A. Estimated Annual Death and Retirement Rates for Selected Occupations, by Sex, for Employed Workers in the United States 1/

Occupations	Male	Female 2/
Employment, total	2.0	4.8
Professional, technical, and kindred	1.6	4.9
Engineers, technical	1.3	
Engineers, aeronautical	0.7	
Engineers, chemical	0.9	
Engineers, civil	1.9	
Engineers, electrical	1.0	
Engineers, industrial	1.1	
Engineers, mechanical	1.4	
Engineers, metallurgical, etc.	1.2	
Engineers, mining	1.4	
Other engineers, technical	1.3	
Natural scientists	1.0	
Chemist	1.1	
Agricultural scientists	1.5	
Biological scientists	1.0	
Geologists and geophysicists	0.9	
Mathematicians	0.4	
Physicists	0.7	
Other natural scientists	0.9	
Technicians, excluding medical-dental	0.7	
Technicians, electrical and electronic	0.6	
Technicians, other engineering and physical scientists	0.8	
Draftsmen	0.8	
Surveyors	1.2	
Technicians, other	1.1	
Medical and other health workers	2.5	4.9
Dietitians and nutritionists	1.3	4.8
Nurses, professional		4.6
Pharmacists	2.8	
Psychologists	0.8	4.5
Technicians, medical and dental	1.1	5.2
Veterinarians	2.0	
Teachers	1.3	4.8
Teachers, elementary	1.1	4.8
Teachers, secondary	1.3	4.8
Teachers, other except college	1.5	4.8
Teachers, college	1.7	4.9
Social scientists	1.4	
Economists	1.5	
Statisticians and actuaries	1.6	
Other social scientists	1.4	
Other professional, technical, and kindred	1.3	4.9
Accountants and auditors	1.9	4.4
Architects	2.4	
Clergymen	2.6	
Designers, except design draftsmen	1.5	
Editors and reporters	1.9	4.9
Lawyers and judges	2.9	
Librarians	1.3	5.3
Personnel and labor relations workers	1.5	3.9
Photographers	1.6	4.3
Social and welfare workers	1.7	4.7
Professional and technical workers, not elsewhere classified	1.3	4.9

See footnotes at end of table.

Appendix A. Estimated Annual Death and Retirement Rates for Selected Occupations, by Sex, for Employed Workers in the United States 1/--Continued

Occupations	Male	Female 2/
Managers, officials, and proprietors	2.5	4.7
Conductors, railroad	3.8	
Creditmen	1.6	
Officers, pilots, engineers, ship	2.1	
Purchasing agents	1.8	
Postmasters and assistants	3.8	
Other managers, officials, and proprietors	2.1	
Clerical and kindred workers	1.8	4.9
Stenographers, typists, and secretaries		5.1
Office machine operators	0.6	5.1
Other clerical and kindred workers	1.9	4.8
Bookkeepers, total	2.3	4.5
Bank tellers	1.4	4.6
Cashiers	1.6	4.5
Mail carriers	1.6	4.1
payroll and timekeeping clerks	2.0	4.3
Postal clerks	1.5	4.2
Shipping and receiving clerks	1.5	4.0
Telephone operators	1.7	5.0
Clerical and kindred workers, not elsewhere classified	1.9	4.8
Sales workers	2.0	4.7
Insurance agents and brokers	2.0	5.3
Real estate agents and brokers	4.1	
Other sales workers, not elsewhere classified	2.0	4.7
Craftsmen, foremen, and kindred workers	1.9	4.3
Construction craftsmen	2.0	
Carpenters	2.3	
Brickmasons, stone, and tile setters	1.5	
Cement and concrete finishers	1.5	
Electricians	1.6	
Excavating, grading machine operators	1.3	
Painters and paperhangers	2.5	
Plasterers	1.7	
Plumbers and pipefitters	1.8	
Foremen, not elsewhere classified	1.9	3.8
Metalworking craftsmen, except mechanics	1.9	
Machinists	2.0	
Blacksmiths, forge hammermen	3.4	
Boilermakers	2.1	
Heat treaters, annealers, etc.	1.8	
Millwrights	1.9	
Molders, metal (except coremakers)	1.6	
Patternmakers, metal and wood	2.0	
Rollers and roll hands	1.8	
Sheet metal workers (tinsmiths)	1.5	
Tool-and-die makers	1.8	
Mechanics and repairmen	1.6	
Air-conditioning, heating, and refrigeration mechanics	1.3	
Airplane mechanics	1.0	
Motor vehicles mechanics	1.3	
Office machine mechanics	0.9	
Radio and television mechanics	0.9	
Railroad and car shop mechanics	2.7	
Other mechanics and repairmen	2.0	

See footnotes at end of table.

Appendix A. Estimated Annual Death and Retirement Rates for Selected Occupations, by Sex, for Employed Workers in the United States 1/--Continued

Occupations	Male	Female 2/
Printing trades craftsmen	1.8	
Compositors and typesetters	1.9	
Electrotypers and stereotypers	2.0	
Engravers, except photoengravers	2.2	
Photoengravers and lithographers	1.5	
Pressmen and plate printers	1.5	
Transportation and public utility craftsmen	2.5	
Line and servicemen, telephone, power	0.9	
Locomotive engineers	4.4	
Locomotive firemen	1.3	
Other craftsmen and kindred workers	1.8	4.5
Bakers	2.1	4.7
Cabinetmakers	2.6	
Cranemen, derrickmen, hoistmen	1.7	
Glaziers	1.2	
Jewelers and watchmakers	2.7	4.9
Loom fixers	1.7	
Millers	2.2	
Opticians, lens grinders, etc.	1.7	3.7
Stationary engineers	2.2	
Inspectors, log and lumber	2.1	3.2
Inspectors, other	2.4	5.0
Upholsterers	1.7	4.0
Craftsmen and kindred workers, not elsewhere classified	1.5	5.0
Operatives and kindred workers	1.5	4.1
Drivers and deliverymen	1.3	3.6
Drivers, bus, truck, tractor	1.2	
Deliverymen, routemen, cab drivers	1.4	4.3
Selected transportation and public utility operators	1.7	
Brakemen and switchmen, railroad	1.8	
Power station operators	2.0	
Sailors and deck hands	1.4	
Semiskilled metalworking occupations	1.4	
Assemblers	1.3	3.7
Furnacemen, smelterers, powers	1.6	
Heaters, metal	2.4	
Checkers, examiners, etc.	1.6	
Welders	1.2	3.7
Semiskilled textile occupations	2.1	4.2
Knitters, loopers, and toppers	1.2	4.4
Spinners, textile	1.9	3.4
Weavers, textile	1.7	3.6
Sewers and stitchers manufacturing	2.9	4.3
Other operatives and kindred workers	1.4	4.4
Attendants, automobile park	1.0	
Blasters and powdermen	1.5	
Laundry and dry cleaning	2.1	4.4
Meat cutters, except meatpacking	2.0	3.9
Operatives and kindred workers, not elsewhere classified	1.5	4.0
Service workers	2.7	4.7
Private household workers	3.7	5.7
Protective service workers	2.6	
Policemen, detective, etc.	1.4	
Guards, watchmen, doorkeepers	4.3	

See footnotes at end of table.

Appendix A. Estimated Annual Death and Retirement Rates for
Selected Occupations, by Sex, for Employed Workers
in the United States 1/--Continued

Occupations	Male	Female 2/
Waiters, cooks, and bartenders	2.1	4.4
Bartenders	2.5	3.4
Cooks, except private household	2.2	4.5
Counter and fountain workers	1.3	4.7
Waiters and waitresses	1.9	4.3
Other service workers	2.0	5.0
Attendants, hospital and other institutions	1.7	4.7
Charwomen and cleaners	2.4	5.2
Janitors and sextons	4.0	5.3
Nurses, practical	2.9	5.6
Other service workers, not elsewhere classified	1.7	5.2
Laborers, except farm	1.7	4.7
Farmers and farm workers	1.7	4.7

1/ Based on 1960 labor force participation rates and age distributions. This table is the National death and retirement rates for males and females for the occupations appearing in the matrix and does not take into account the peculiarities of the working life patterns associated with the various occupations.

2/ Note, for females, the separation rate is a gross rate. If females returning to the labor force were deducted from this gross rate, the net separation rate would be considerably lower. For example, as explained in Chapter 2, the net separation rate would be about 3.0 percent.

Appendix B. Projections of the Population and Labor Force for States and Regions, by Age and Color[1]

The total resident labor force of the United States is expected to increase by more than 15 million persons from 1960 to 1970, and again by a similar amount from 1970 to 1980, and to rise to just over 100 million in 1980. This projected growth rate will vary considerably by geographic location.

On a regional basis, the West is expected to show the greatest increase during the present decade–36 percent. The other regions will expand at somewhat smaller rates: 25 percent in the South, 17 percent in the North Central region, and 16 percent in the Northeast. These regional variations are attributable in large part to the expected continuation of differences in economic opportunity which affect the flow of population.

The projections of the labor force by State which are presented here are consistent with the projections of the Nation's total labor force published by the Bureau of Labor Statistics,[2] except for the exclusion of Armed Forces stationed outside the country. Data for nonwhites are shown for 24 States and the District of Columbia.[3] The population projections on which these labor force projections are based were prepared by the Bureau of the Census and are consistent with the Series II-B projections, *Current Population Reports,* "Illustrative Projections of the Population of States: 1970 to 1980," Series P-25, No. 326.[4] This series of State labor force projections is only one of a possible set that could be developed on the basis of alternative assumptions in regard to interstate migration of population. The effect of such an alternative is discussed in the later section on reliability.

The Present Decade

Between 1960 and 1970, the total resident labor force of the United States is expected to grow by 22 percent–from 69.9 million to 85.3 million. (See table 1. Detailed projections by State are shown in table 2, pp. 70-96.)[5] This increase of 15.4 million persons is very likely to be distributed unevenly both by region and by age, for two reasons: The continuation of past economic advantages of some regions, for instance, the West, and the rapid increase in the number of young persons of working age, which will be more important in this period than in the 1970-80 decade.

Six of the States in the West are expected to show increases of 30 percent or more: Nevada, Arizona, Utah, California, Colorado, and New Mexico. (See table 3.) Two of these, Nevada and Arizona, may have increases of more than 50 percent. In the South, Florida is expected to increase about 42 percent–the only State outside of the West with a gain greatly in excess of the national average.

Maryland, Idaho, Georgia, Arkansas, Delaware, Mississippi, Louisiana, Virginia, and Texas will have a projected growth of 25 percent or more. Washington, New Jersey, North Carolina, New Hampshire, and Wyoming will experience gains equal to the national average of 22 percent.

At the lower end of the scale, 25 States will have growth rates ranging from 10 percent to 21 percent. Only the District of Columbia will be likely to show a gain of less than 10 percent. Since the District is a small and strictly urban area, however, its growth trends cannot be compared with those of the States; growth of the metropolitan area takes place outside the central city.

For the Nation as a whole, the number of young workers, 14 to 24 years old, rises very rapidly during the present decade, while the number of workers age 25 and over increases much less. The increase in younger workers reflects chiefly the high birth rate during the

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[1] From "Labor Force Projections, 1970 and 1980," *Monthly Labor Review,* October 1966, U.S. Department of Labor, Bureau of Labor Statistics.

[2] "Labor Force Projections for 1970-80," *Monthly Labor Review,* February 1965, pp. 129-140, reprinted as Special Labor Force Report No. 49, and "Labor Force Projections by Color, 1970-80," *Monthly Labor Review,* September 1966, reprinted as Special Labor Force Report No. 73.

[3] Detail by color is not shown for the 26 States whose nonwhite population age 14 years and over was less than 100,000 in 1960.

[4] These State projections are themselves consistent with Series B of the national population which were published in report Series P-25, No. 286. Series II-B refers to population Series B and migration Series II. In migration Series II, it is assumed that State migration differentials will gradually be reduced to zero in about 50 years, i.e., the number of persons migrating from a State will eventually be offset by an equal number of persons moving into the State.

[5] For the 1960 data, the source is the decennial census, Apr. 1, 1960. The projected data for 1970 and 1980, on the other hand, are consistent with annual average levels from the monthly labor force (household) survey and July 1 population estimates from the Bureau of the Census. For this reason, changes during the 1960-70 decade are not strictly comparable with changes during the 1970-80 decade. Nevertheless, such comparisons indicate the broad outlines of the differences among States in projected growth during the two decades.

TABLE 1. POPULATION AND LABOR FORCE (EXCLUDING ARMED FORCES OVERSEAS), BY AGE AND COLOR, UNITED STATES AND BY REGION, 1960 AND PROJECTED 1970 AND 1980[1]

[Numbers in thousands]

Color, region, and age	Population (July 1)					Labor force (annual average)				
	1960 (April)	1970	1980	Percent change		1960 (April)	1970	1980	Percent change	
				1960-70	1970-80				1960-70	1970-80
ALL CLASSES										
Total, United States										
14 years and over	126,277	148,944	173,161	18.0	16.3	69,877	85,257	100,670	22.0	18.1
14 to 24 years	26,839	39,625	45,369	47.6	14.5	12,009	19,934	23,652	66.0	18.6
25 to 54 years	67,523	71,249	83,650	5.5	17.4	45,573	50,472	60,062	10.7	19.0
55 years and over	31,915	38,070	44,142	19.3	15.9	12,295	14,852	16,956	20.8	14.2
Northeast										
14 years and over	32,561	37,041	41,570	13.8	12.2	18,260	21,150	23,762	15.8	12.3
14 to 24 years	6,149	8,860	10,052	44.1	13.5	2,775	4,335	5,051	56.2	16.5
25 to 54 years	17,606	17,905	19,933	1.7	11.3	11,951	12,658	14,089	5.9	11.3
55 years and over	8,806	10,276	11,586	16.7	12.7	3,535	4,157	4,622	17.6	11.2
North Central										
14 years and over	36,157	40,675	46,559	12.5	14.5	20,047	23,399	27,362	16.7	16.9
14 to 24 years	7,460	10,726	12,164	43.8	13.4	3,455	5,523	6,534	59.9	18.3
25 to 54 years	19,096	19,241	22,444	.8	16.6	12,805	13,576	16,042	6.0	18.2
55 years and over	9,602	10,707	11,950	11.5	11.6	3,787	4,301	4,786	13.6	11.3
South										
14 years and over	37,948	45,702	53,393	20.4	16.8	20,398	25,569	30,514	25.4	19.3
14 to 24 years	8,973	12,963	14,592	44.5	12.6	3,770	6,189	7,133	64.2	15.3
25 to 54 years	20,076	21,599	25,671	7.6	18.9	13,436	15,338	18,744	14.2	22.2
55 years and over	8,900	11,140	13,129	25.2	17.9	3,192	4,043	4,637	26.7	14.7
West										
14 years and over	19,610	25,526	31,640	30.2	24.0	11,172	15,139	19,032	35.5	25.7
14 to 24 years	4,257	7,074	8,560	66.2	21.0	2,009	3,888	4,934	93.5	26.9
25 to 54 years	10,745	12,505	15,603	16.4	24.8	7,382	8,901	11,187	20.6	25.7
55 years and over	4,607	5,947	7,476	29.1	25.7	1,781	2,351	2,911	32.0	23.8
NONWHITE										
Total, United States										
14 years and over	13,154	16,384	20,638	24.6	26.0	7,399	9,671	12,219	30.7	26.3
14 to 24 years	3,297	5,228	6,777	58.6	29.6	1,311	2,493	3,335	90.2	33.8
25 to 54 years	7,182	7,934	10,013	10.5	26.2	5,008	5,837	7,337	16.6	25.7
55 years and over	2,675	3,223	3,849	20.5	19.4	1,080	1,341	1,547	24.2	15.4
Northeast										
14 years and over	2,163	2,791	3,596	29.0	28.8	1,312	1,748	2,222	33.2	27.1
14 to 24 years	475	769	1,098	61.9	42.8	216	395	585	82.9	48.1
25 to 54 years	1,291	1,497	1,808	16.0	20.8	913	1,110	1,322	21.6	19.1
55 years and over	398	525	691	31.9	31.6	183	244	315	33.3	29.1
North Central										
14 years and over	2,340	2,930	3,803	25.2	29.8	1,310	1,699	2,243	29.7	32.0
14 to 24 years	521	907	1,264	74.1	39.4	203	420	637	106.9	51.7
25 to 54 years	1,363	1,459	1,829	7.0	25.4	922	1,049	1,317	13.8	25.5
55 years and over	457	565	710	23.6	25.7	184	231	290	25.5	25.5
South										
14 years and over	7,209	8,704	10,585	20.7	21.6	3,928	5,025	6,155	27.9	22.5
14 to 24 years	1,948	2,932	3,523	50.5	20.2	747	1,365	1,643	82.7	20.4
25 to 54 years	3,679	3,968	5,067	7.9	27.7	2,574	2,947	3,774	14.5	28.1
55 years and over	1,582	1,804	1,996	14.0	10.6	607	713	738	17.5	3.5
West										
14 years and over	1,442	1,960	2,654	35.9	35.4	850	1,199	1,599	41.1	33.4
14 to 24 years	353	620	892	75.6	43.9	145	313	470	115.9	50.2
25 to 54 years	850	1,010	1,309	18.8	29.6	599	732	925	22.2	26.4
55 years and over	239	330	452	38.1	37.0	106	153	205	44.3	34.0

[1] See text footnote 4.

TABLE 2. POPULATION AND LABOR FORCE (EXCLUDING ARMED FORCES OVERSEAS), BY AGE, COLOR,[1] AND SEX, FOR REGIONS AND STATES, 1960 AND PROJECTED 1970 AND 1980

[Numbers in thousands]

Age, color, and sex	Population (July 1)			Labor force (annual average)			Labor force participation rates (percent)			Percent change			
										1960–70		1970–80	
	1960 (April 1)	1970	1980	1960 (April 1)	1970	1980	1960	1970	1980	Population	Labor force	Population	Labor force
	United States												
ALL CLASSES													
Both sexes, 14 and over	126,277	148,944	173,161	69,877	85,257	100,670	55.3	57.2	58.1	18.0	22.0	16.3	18.1
Male													
Total, 14 and over	61,315	71,795	83,380	47,468	55,105	64,246	77.4	76.8	77.1	17.1	16.1	16.1	16.6
14–24 years	13,385	19,846	22,786	7,643	12,264	14,443	57.1	61.8	63.4	48.3	60.5	14.8	17.8
25–54 years	33,052	34,807	41,212	31,296	33,348	39,524	94.7	95.8	95.9	5.3	6.6	18.4	18.5
55 years and over	14,878	17,143	19,382	8,528	9,494	10,279	57.3	55.4	53.0	15.2	11.3	13.1	8.3
Female													
Total, 14 and over	64,961	77,148	89,781	22,410	30,152	36,424	34.5	39.1	40.6	18.8	34.5	16.4	20.8
14–24 years	13,454	19,779	22,583	4,366	7,670	9,209	32.5	38.8	40.8	47.0	75.7	14.2	20.1
25–54 years	34,471	36,442	42,438	14,277	17,124	20,5[illegible]	41.4	47.0	48.4	5.7	19.9	16.5	19.9
55 years and over	17,037	20,927	24,760	3,767	5,358	6,677	22.1	25.6	27.0	22.8	42.2	18.3	24.6
NONWHITE													
Male													
Total, 14 and over	6,279	7,769	9,791	4,528	5,761	7,333	72.1	74.2	74.9	23.7	27.2	26.0	27.3
14–24 years	1,607	2,549	3,315	822	1,519	2,010	51.2	59.6	60.6	58.6	84.7	30.0	32.3
25–54 years	3,389	3,729	4,771	3,005	3,432	4,424	88.7	92.0	92.7	10.0	14.2	27.9	28.9
55 years and over	1,283	1,490	1,705	700	810	899	54.6	54.4	52.7	16.1	15.7	14.4	11.0
Female													
Total, 14 and over	6,874	8,616	10,847	2,872	3,910	4,886	41.8	45.4	45.0	25.3	36.2	25.9	25.0
14–24 years	1,689	2,678	3,461	489	974	1,325	28.9	36.4	38.3	58.6	99.2	29.2	36.0
25–54 years	3,793	4,204	5,242	2,002	2,405	2,913	52.8	57.2	55.6	10.8	20.1	24.7	21.1
55 years and over	1,392	1,733	2,144	380	531	648	27.3	30.6	30.2	24.5	39.6	23.7	22.0
	Northeast												
ALL CLASSES													
Both sexes, 14 and over	32,561	37,041	41,570	18,260	21,150	23,762	56.1	57.1	57.2	13.8	15.8	12.2	12.4
Male													
Total, 14 and over	15,547	17,575	19,754	12,122	13,501	15,248	78.0	76.8	77.2	13.0	11.4	12.4	12.9
14–24 years	3,005	4,344	4,957	1,616	2,526	3,040	53.8	58.1	61.3	44.6	56.3	14.1	20.4
25–54 years	8,509	8,688	9,780	8,099	8,362	9,436	95.2	96.2	96.5	2.1	3.2	12.6	12.9
55 years and over	4,034	4,543	5,017	2,406	2,614	2,772	59.7	57.5	55.3	12.6	8.6	10.4	6.1
Female													
Total, 14 and over	17,014	19,466	21,816	6,138	7,649	8,514	36.1	39.3	39.0	14.4	24.6	12.1	11.3
14–24 years	3,144	4,517	5,095	1,158	1,809	2,011	36.8	40.1	39.5	43.7	56.2	12.8	11.2
25–54 years	9,097	9,217	10,152	3,851	4,296	4,653	42.3	46.6	45.8	1.3	11.5	10.2	8.3
55 years and over	4,773	5,733	6,569	1,128	1,544	1,850	23.6	26.9	28.2	20.1	36.8	14.6	19.8
NONWHITE													
Male													
Total, 14 and over	1,006	1,277	1,645	762	990	1,285	75.8	77.5	78.1	27.0	29.8	28.8	29.9
14–24 years	220	360	523	119	218	326	54.1	60.5	62.3	63.7	82.8	45.3	49.7
25–54 years	598	682	824	530	633	782	88.8	92.8	94.9	14.1	19.3	20.8	23.5
55 years and over	188	236	298	113	139	178	59.9	59.1	59.7	25.1	23.3	26.6	27.9
Female													
Total, 14 and over	1,157	1,514	1,951	549	759	936	47.5	50.1	48.0	30.8	38.1	28.9	23.4
14–24 years	255	409	574	96	177	259	37.9	43.3	45.1	60.6	83.8	40.3	46.2
25–54 years	693	815	984	383	477	540	55.2	58.5	54.9	17.6	24.6	20.7	13.3
55 years and over	209	289	392	70	105	137	33.5	36.1	34.9	38.3	49.2	35.5	30.8

See footnotes at end of table.

TABLE 2. POPULATION AND LABOR FORCE (EXCLUDING ARMED FORCES OVERSEAS), BY AGE, COLOR,[1] AND SEX, FOR REGIONS AND STATES, 1960 AND PROJECTED 1970 AND 1980—Continued

[Numbers in thousands]

Age, color, and sex	Population (July 1)			Labor force (annual-average)			Labor force participation rates (percent)			Percent change			
										1960-70		1970-80	
	1960 (April 1)	1970	1980	1960 (April 1)	1970	1980	1960	1970	1980	Population	Labor force	Population	Labor force
	North Central												
ALL CLASSES													
Both sexes, 14 and over	36,157	40,675	46,559	20,047	23,399	27,362	55.4	57.5	58.8	12.5	16.7	14.5	16.9
Male													
Total, 14 and over	17,588	19,684	22,574	13,786	15,250	17,650	78.4	77.5	78.2	11.9	10.6	14.7	15.7
14-24 years	3,651	5,274	6,008	2,144	3,308	3,923	58.7	62.7	65.3	44.5	54.3	13.9	18.6
25-54 years	9,407	9,546	11,263	8,982	9,201	10,848	95.5	96.4	96.3	1.5	2.4	18.0	17.9
55 years and over	4,531	4,864	5,303	2,660	2,742	2,879	58.7	56.4	54.3	7.4	3.1	9.0	5.0
Female													
Total, 14 and over	18,569	20,991	23,985	6,261	8,149	9,712	33.7	38.8	40.5	13.0	30.2	14.3	19.2
14-24 years	3,809	5,453	6,157	1,312	2,215	2,611	34.4	40.6	42.4	43.1	68.9	12.9	17.9
25-54 years	9,688	9,695	11,181	3,822	4,375	5,194	39.5	45.1	46.5	.1	14.5	15.3	18.7
55 years and over	5,071	5,844	6,647	1,127	1,559	1,907	22.2	26.7	28.7	15.2	38.3	13.7	22.3
NONWHITE													
Male													
Total, 14 and over	1,123	1,382	1,785	824	1,019	1,345	73.3	73.7	75.3	23.0	23.7	29.2	32.0
14-24 years	245	431	606	122	241	365	49.8	55.9	60.2	76.2	97.9	40.7	51.4
25-54 years	654	685	859	577	634	807	88.3	92.5	94.0	4.7	9.8	25.4	27.4
55 years and over	224	266	320	125	144	173	55.5	54.2	54.0	18.5	15.7	20.2	19.8
Female													
Total, 14 and over	1,217	1,548	2,018	486	681	899	39.9	44.0	44.5	27.2	40.1	30.4	32.0
14-24 years	276	476	658	82	179	272	29.6	37.6	41.4	72.2	118.8	38.3	52.2
25-54 years	709	774	971	344	415	509	48.6	53.6	52.5	9.2	20.5	25.4	22.7
55 years and over	232	299	390	60	87	117	25.7	29.1	30.0	28.6	45.5	30.6	34.8
	South												
ALL CLASSES													
Both sexes, 14 and over	37,948	45,702	53,392	20,398	25,569	30,514	53.8	55.9	57.2	20.4	25.4	16.8	19.3
Male													
Total, 14 and over	18,418	22,046	25,700	13,852	16,388	19,042	75.2	74.3	74.1	19.7	18.3	16.6	16.2
14-24 years	4,546	6,612	7,449	2,530	3,941	4,425	55.7	59.6	59.4	45.5	55.8	12.7	12.3
25-54 years	9,747	10,435	12,529	9,089	9,857	11,849	93.2	94.5	94.6	7.1	8.4	20.1	20.2
55 years and over	4,125	4,998	5,722	2,233	2,590	2,768	54.1	51.8	48.4	21.2	16.0	14.5	6.8
Female													
Total, 14 and over	19,530	23,657	27,692	6,546	9,181	11,472	33.5	38.8	41.4	21.1	40.2	17.1	25.0
14-24 years	4,427	6,352	7,143	1,240	2,248	2,708	28.0	35.4	37.9	43.5	81.3	12.5	20.5
25-54 years	10,328	11,163	13,142	4,347	5,481	6,894	42.1	49.1	52.5	8.1	26.1	17.7	25.8
55 years and over	4,775	6,142	7,407	960	1,452	1,870	20.1	23.6	25.2	28.6	51.3	20.6	28.7
NONWHITE													
Male													
Total, 14 and over	3,406	4,141	5,083	2,380	3,006	3,716	69.9	72.6	73.1	21.6	26.3	22.7	23.6
14-24 years	963	1,447	1,741	487	868	1,039	50.5	60.0	59.7	50.3	78.3	20.3	19.7
25-54 years	1,703	1,880	2,473	1,507	1,715	2,254	88.5	91.2	91.1	10.4	13.8	31.5	31.4
55 years and over	740	814	868	386	424	424	52.2	52.1	48.8	10.1	9.7	6.7	0.0
Female													
Total, 14 and over	3,803	4,562	5,502	1,548	2,018	2,439	40.7	44.2	44.3	20.0	30.4	20.6	20.8
14-24 years	985	1,485	1,782	260	497	604	26.4	33.5	33.9	50.8	90.9	20.0	21.5
25-54 years	1,976	2,088	2,593	1,067	1,232	1,521	54.0	59.0	58.6	5.6	15.5	24.2	23.4
55 years and over	842	990	1,127	221	289	314	26.2	29.2	27.8	17.5	31.1	13.9	8.5

See footnotes at end of table.

TABLE 2. POPULATION AND LABOR FORCE (EXCLUDING ARMED FORCES OVERSEAS), BY AGE, COLOR,[1] AND SEX, FOR REGIONS AND STATES, 1960 AND PROJECTED 1970 AND 1980—Continued

[Numbers in thousands]

Age, color, and sex	Population (July 1)			Labor force (annual average)			Labor force participation rates (percent)			Percent change			
										1960–70		1970–80	
	1960 (April 1)	1970	1980	1960 (April 1)	1970	1980	1960	1970	1980	Population	Labor force	Population	Labor force
						West							
ALL CLASSES													
Both sexes, 14 and over	19,610	25,526	31,640	11,172	15,139	19,032	57.0	59.3	60.2	30.2	35.5	24.0	25.7
Male													
Total, 14 and over	9,762	12,491	15,352	7,708	9,966	12,306	79.0	79.8	80.2	28.0	29.3	22.9	23.5
14–24 years	2,184	3,617	4,372	1,353	2,490	3,055	62.0	68.8	69.9	65.6	84.0	20.9	22.7
25–54 years	5,389	6,137	7,641	5,125	5,929	7,390	95.1	96.6	96.7	13.9	15.7	24.5	24.6
55 years and over	2,189	2,738	3,339	1,229	1,548	1,860	56.2	56.5	55.7	25.1	25.9	22.0	20.2
Female													
Total, 14 and over	9,848	13,035	16,287	3,464	5,173	6,726	35.2	39.7	41.3	32.4	49.3	25.0	30.0
14–24 years	2,073	3,458	4,188	656	1,398	1,879	31.6	40.4	44.9	66.8	113.1	21.1	34.4
25–54 years	5,356	6,368	7,962	2,256	2,972	3,796	42.1	46.7	47.7	18.9	31.7	25.0	27.7
55 years and over	2,418	3,209	4,137	552	803	1,051	22.8	25.0	25.4	32.7	45.6	28.9	30.8
NONWHITE													
Male													
Total, 14 and over	745	968	1,278	562	746	987	75.4	77.0	77.2	30.0	32.8	32.0	32.2
14–24 years	180	312	445	95	193	281	52.7	61.9	63.1	73.2	103.1	42.7	45.6
25–54 years	434	482	615	390	450	581	89.8	93.4	94.6	11.0	15.4	27.5	29.1
55 years and over	130	174	218	76	103	124	58.5	59.0	57.1	33.6	34.6	25.0	21.0
Female													
Total, 14 and over	697	991	1,376	289	452	613	41.4	45.6	44.5	42.2	56.8	38.8	35.4
14–24 years	173	308	447	50	121	189	29.0	39.2	42.3	77.7	140.0	45.2	56.9
25–54 years	415	528	694	208	281	343	50.2	53.3	49.4	27.0	35.0	31.5	21.9
55 years and over	108	155	234	30	50	80	27.6	32.4	34.3	43.7	68.8	50.8	59.4
						New England							
ALL CLASSES													
Both sexes, 14 and over	7,582	8,628	9,828	4,331	5,044	5,767	57.1	58.5	58.7	13.8	16.5	13.9	14.3
Male													
Total, 14 and over	3,628	4,119	4,708	2,833	3,207	3,726	78.1	77.9	79.1	13.5	13.2	14.3	16.2
14–24 years	751	1,096	1,258	428	695	857	57.0	63.4	68.1	45.9	62.2	14.7	23.3
25–54 years	1,943	1,992	2,307	1,856	1,924	2,234	95.6	96.6	96.8	2.5	3.7	15.8	16.1
55 years and over	934	1,030	1,144	548	588	635	58.7	57.1	55.5	10.3	7.2	11.1	8.0
Female													
Total, 14 and over	3,955	4,509	5,119	1,499	1,838	2,041	37.9	40.8	39.9	14.0	22.6	13.5	11.1
14–24 years	748	1,085	1,240	287	459	517	38.4	42.3	41.7	45.1	60.0	14.3	12.6
25–54 years	2,046	2,084	2,362	918	1,003	1,089	44.8	48.1	46.1	1.8	9.3	13.3	8.5
55 years and over	1,160	1,340	1,517	294	375	435	25.3	28.0	28.7	15.5	27.7	13.3	16.0
NONWHITE													
Male													
Total, 14 and over	86	117	161	68	96	133	78.1	82.4	82.9	35.5	42.9	37.5	38.3
14–24 years	21	36	55	13	25	39	61.5	69.7	70.4	70.8	93.6	51.5	53.0
25–54 years	51	63	82	46	61	80	90.8	96.5	97.6	24.8	32.6	30.3	31.8
55 years and over	15	18	24	9	10	14	58.4	58.1	60.7	21.2	20.6	34.5	40.5
Female													
Total, 14 and over	90	129	180	42	64	86	46.6	49.6	47.7	43.6	52.6	39.9	34.8
14–24 years	22	38	57	8	17	26	38.2	44.9	46.1	73.3	103.6	50.5	54.6
25–54 years	52	70	93	28	39	49	53.6	55.8	52.4	35.3	40.9	33.6	25.4
55 years and over	16	21	30	6	8	11	35.8	37.1	36.2	29.8	34.6	41.9	38.4

See footnotes at end of table.

TABLE 2. POPULATION AND LABOR FORCE (EXCLUDING ARMED FORCES OVERSEAS), BY AGE, COLOR,[1] AND SEX, FOR REGIONS AND STATES, 1960 AND PROJECTED 1970 AND 1980—Continued

[Numbers in thousands]

Age, color, and sex	Population (July 1)			Labor force (annual average)			Labor force participation rates (percent)			Percent change			
										1960-70		1970-80	
	1960 (April 1)	1970	1980	1960 (April 1)	1970	1980	1960	1970	1980	Population	Labor force	Population	Labor force
							Maine						
ALL CLASSES													
Both sexes, 14 and over	683	748	833	370	413	468	54.2	55.2	56.2	9.4	11.5	11.4	13.4
Male													
Total, 14 and over	334	365	406	252	273	308	75.4	74.8	76.0	9.2	8.2	11.3	13.1
14-24 years	76	105	116	43	66	77	56.6	62.8	66.3	38.6	53.7	9.8	15.8
25-54 years	168	165	192	159	158	185	95.0	96.0	96.3	−1.6	−.6	16.3	16.7
55 years and over	90	94	98	49	48	47	54.7	51.0	47.7	4.4	−2.8	4.4	−2.3
Female													
Total, 14 and over	349	383	427	119	140	160	33.9	36.6	37.4	9.6	18.4	11.5	13.9
14-24 years	73	98	107	22	35	42	30.3	35.2	38.8	34.6	56.3	9.8	20.8
25-54 years	173	170	194	72	77	86	41.4	45.0	44.3	−1.7	6.8	14.4	12.5
55 years and over	103	115	124	25	29	32	23.9	25.5	25.6	11.0	18.0	8.7	9.2
							New Hampshire						
ALL CLASSES													
Both sexes, 14 and over	433	512	597	251	307	364	58.0	60.0	61.1	18.3	22.3	16.4	18.5
Male													
Total, 14 and over	210	248	291	162	191	228	77.3	77.0	78.4	18.5	18.0	17.1	19.3
14-24 years	45	68	79	25	42	52	56.3	62.2	66.0	51.5	67.4	16.4	23.4
25-54 years	109	118	143	105	115	140	96.3	97.3	97.6	8.9	10.0	21.2	21.5
55 years and over	56	62	68	32	34	36	57.3	54.4	52.6	10.9	5.3	10.1	6.5
Female													
Total, 14 and over	224	264	306	89	116	136	39.9	44.0	44.5	18.1	30.0	15.8	17.3
14-24 years	43	65	76	16	29	34	38.0	44.6	44.8	52.2	78.9	16.9	17.0
25-54 years	113	120	141	55	64	76	48.7	53.4	53.9	6.1	16.4	17.5	18.5
55 years and over	68	79	89	18	23	26	26.6	29.1	29.5	16.5	27.1	12.7	14.3
							Vermont						
ALL CLASSES													
Both sexes, 14 and over	274	315	359	149	180	211	54.6	57.1	58.6	15.2	20.5	13.9	17.0
Male													
Total, 14 and over	132	154	178	101	117	137	76.2	76.1	77.0	16.2	16.0	15.6	17.1
14-24 years	31	43	48	17	26	29	54.6	60.5	61.6	40.8	56.1	10.6	12.5
25-54 years	66	72	90	63	70	86	95.5	96.2	96.0	9.4	10.2	24.0	23.8
55 years and over	35	38	40	21	21	21	58.7	55.3	52.8	7.6	1.3	5.5	7
Female													
Total, 14 and over	142	162	182	49	63	74	34.4	39.1	40.7	14.3	30.1	12.3	16.8
14-24 years	30	43	46	9	16	19	31.5	38.0	40.2	42.1	71.9	8.1	14.4
25-54 years	69	71	83	29	34	41	42.0	48.1	49.3	3.4	18.4	17.0	19.9
55 years and over	43	48	52	10	13	14	24.1	26.7	27.3	12.3	24.2	9.0	11.5
							Massachusetts						
ALL CLASSES													
Both sexes, 14 and over	3,740	4,150	4,683	2,129	2,434	2,763	56.9	58.6	59.0	11.0	14.3	12.8	13.5
Male													
Total, 14 and over	1,768	1,961	2,227	1,376	1,531	1,778	77.8	78.1	79.8	11.0	11.3	13.5	16.1
14-24 years	361	512	586	205	327	407	56.8	63.8	69.4	41.9	59.3	14.4	24.6
25-54 years	941	949	1,095	896	914	1,059	95.1	96.3	96.7	.9	2.1	15.3	15.8
55 years and over	465	499	545	275	290	312	59.1	58.1	57.2	7.4	5.4	9.2	7.6
Female													
Total, 14 and over	1,972	2,189	2,456	754	903	985	38.2	41.2	40.1	11.0	19.8	12.2	9.2
14-24 years	368	520	591	150	236	260	40.6	45.4	44.0	41.2	57.6	13.7	10.1
25-54 years	1,004	997	1,123	451	478	511	44.9	48.0	45.5	−.7	6.1	12.7	6.9
55 years and over	600	672	742	153	189	215	25.5	28.1	28.9	12.0	23.2	10.4	13.8

See footnotes at end of table.

TABLE 2. POPULATION AND LABOR FORCE (EXCLUDING ARMED FORCES OVERSEAS), BY AGE, COLOR,[1] AND SEX, FOR REGIONS AND STATES, 1960 AND PROJECTED 1970 AND 1980—Continued

[Numbers in thousands]

Age, color, and sex	Population (July 1)			Labor force (annual average)			Labor force participation rates (percent)			Percent change			
										1960-70		1970-80	
	1960 (April 1)	1970	1980	1960 (April 1)	1970	1980	1960	1970	1980	Population	Labor force	Population	Labor force
	Rhode Island												
ALL CLASSES													
Both sexes, 14 and over	628	698	759	360	396	426	57.3	56.8	56.1	11.2	10.2	8.6	7.4
Male													
Total, 14 and over	304	334	361	238	258	282	78.4	77.2	78.1	9.8	8.3	8.2	9.4
14-24 years	69	102	111	44	70	80	63.3	69.0	72.8	47.0	6.1	8.4	14.4
25-54 years	159	148	161	152	143	156	95.5	96.4	97.0	−6.5	−5.7	8.5	9.1
55 years and over	75	83	89	42	44	45	56.0	53.2	50.7	10.1	4.6	7.4	2.4
Female													
Total, 14 and over:													
14-24 years	324	365	398	122	139	144	37.6	38.0	36.2	12.6	13.8	9.1	3.8
25-54 years	60	87	94	23	32	33	37.7	36.7	35.5	44.5	40.9	7.7	4.1
55 years and over	169	167	181	77	80	81	45.8	47.8	44.6	.9	3.5	8.1	.9
	Connecticut												
ALL CLASSES													
Both sexes, 14 and over	1,824	2,204	2,598	1,071	1,314	1,535	58.7	59.6	59.1	20.8	22.7	17.9	16.8
Male													
Total, 14 and over	881	1,057	1,247	705	837	993	80.0	79.2	79.6	20.0	18.9	18.0	18.6
14-24 years	169	236	319	94	163	211	55.8	61.5	66.3	57.0	73.1	20.0	29.4
25-54 years	500	538	625	481	523	608	96.4	97.3	97.2	7.6	8.7	16.2	16.2
55 years and over	212	254	303	129	151	174	60.8	59.5	57.3	19.7	17.2	19.6	15.1
Female													
Total, 14 and over	944	1,147	1,351	367	477	542	38.9	41.6	40.1	21.5	30.0	17.8	13.7
14-24 years	173	272	325	67	111	130	38.6	41.0	39.9	56.9	66.6	19.6	16.4
25-54 years	519	559	639	234	270	294	45.1	48.3	45.9	7.7	15.4	14.3	8.7
55 years and over	251	316	386	66	95	118	26.1	30.1	30.6	25.7	44.6	22.4	24.6
	Middle Atlantic												
ALL CLASSES													
Both sexes, 14 and over	24,979	28,413	31,742	13,929	16,105	17,996	55.8	56.7	56.7	13.7	15.6	11.7	11.7
Male													
Total, 14 and over	11,920	13,456	15,045	9,289	10,294	11,522	77.9	76.5	76.6	12.9	10.8	11.8	11.9
14-24 years	2,254	3,247	3,699	1,188	1,831	2,183	52.7	56.4	59.0	44.1	54.1	13.9	19.2
25-54 years	6,566	6,696	7,474	6,243	6,437	7,202	95.1	96.1	96.4	2.0	3.1	11.6	11.9
55 years and over	3,100	3,513	3,872	1,858	2,026	2,137	59.9	57.7	55.2	13.3	9.0	10.2	5.5
Female													
Total, 14 and over	13,059	14,957	16,697	4,639	5,811	6,473	35.5	38.9	38.8	14.5	25.3	11.6	11.4
14-24 years	2,396	3,432	3,855	871	1,350	1,494	36.4	39.3	38.8	43.2	54.9	12.3	10.7
25-54 years	7,051	7,132	7,791	2,934	3,293	3,565	41.6	46.2	45.8	1.2	12.3	9.2	8.3
55 years and over	3,613	4,393	5,051	834	1,168	1,414	23.1	26.6	28.0	21.6	40.0	15.0	21.1
NONWHITE													
Male													
Total, 14 and over	919	1,160	1,484	695	893	1,152	75.6	77.0	77.6	26.2	28.5	27.9	29.0
14-24 years	199	324	468	106	192	287	53.4	59.4	61.3	62.9	81.5	44.6	49.2
25-54 years	547	619	741	484	572	701	88.6	92.4	94.6	13.1	18.0	19.9	22.6
55 years and over	174	218	275	104	129	164	60.0	59.1	59.6	25.5	23.6	26.0	26.9
Female													
Total, 14 and over	1,067	1,385	1,771	508	695	850	47.5	50.2	48.0	29.8	37.0	27.8	22.3
14-24 years	233	372	517	88	160	233	37.8	43.2	45.0	59.4	81.9	39.3	45.4
25-54 years	641	745	891	355	438	491	55.4	58.8	55.1	16.2	23.3	19.5	12.2
55 years and over	193	269	363	64	97	126	33.3	36.1	34.8	39.0	50.5	35.0	30.2

See footnotes at end of table.

TABLE 2. POPULATION AND LABOR FORCE (EXCLUDING ARMED FORCES OVERSEAS), BY AGE, COLOR,[1] AND SEX, FOR REGIONS AND STATES, 1960 AND PROJECTED 1970 AND 1980—Continued

[Numbers in thousands]

Age, color, and sex	Population (July 1)			Labor force (annual average)			Labor force participation rates (percent)			Percent change			
										1960-70		1970-80	
	1960 (April 1)	1970	1980	1960 (April 1)	1970	1980	1960	1970	1980	Population	Labor force	Population	Labor force
	New York												
ALL CLASSES													
Both sexes, 14 and over	12,389	14,203	15,790	6,999	8,109	8,970	56.5	57.2	56.8	14.6	16.1	11.2	10.4
Male													
Total, 14 and over	5,882	6,683	7,434	4,595	5,150	5,744	78.1	77.1	77.3	13.6	12.1	11.2	11.5
14-24 years	1,087	1,568	1,802	572	883	1,058	52.6	56.3	58.7	44.2	54.4	15.0	19.8
25-54 years	3,218	3,348	3,736	3,050	3,220	3,607	94.8	96.2	96.6	4.1	5.6	11.6	12.0
55 years and over	1,577	1,768	1,896	973	1,048	1,079	61.7	59.3	56.9	12.1	7.6	7.3	3.0
Female													
Total, 14 and over	6,506	7,519	8,356	2,404	2,978	3,226	37.0	39.6	38.6	15.6	23.9	11.1	8.3
14-24 years	1,178	1,694	1,911	440	678	732	37.4	40.1	38.3	43.8	54.1	12.8	7.8
25-54 years	3,491	3,593	3,939	1,506	1,672	1,767	43.2	46.5	44.9	2.9	11.0	9.6	5.7
55 years and over	1,838	2,233	2,506	458	628	727	24.9	28.1	29.0	21.5	37.3	12.3	15.8
NONWHITE													
Male													
Total, 14 and over	476	617	792	365	482	619	76.5	78.2	78.1	29.4	32.2	28.5	28.4
14-24 years	100	166	245	55	100	150	55.1	60.2	61.1	66.1	81.2	47.9	50.3
25-54 years	293	339	402	257	314	380	87.9	92.6	94.7	15.9	22.0	18.3	21.1
55 years and over	84	111	145	52	68	89	62.2	61.3	61.0	33.0	31.0	30.5	29.8
Female													
Total, 14 and over	570	758	970	282	386	459	49.5	51.0	47.4	33.1	36.9	27.9	18.9
14-24 years	122	196	275	49	86	124	40.2	44.2	45.1	60.2	75.7	40.5	43.5
25-54 years	352	421	497	199	246	265	56.6	58.5	53.3	19.8	23.8	18.1	7.5
55 years and over	96	142	198	34	54	70	35.5	37.9	35.6	47.1	57.1	39.7	31.3
	New Jersey												
ALL CLASSES													
Both sexes, 14 and over	4,404	5,346	6,263	2,509	3,062	3,577	57.0	57.3	57.1	21.4	22.0	17.1	16.8
Male													
Total, 14 and over	2,124	2,547	2,976	1,697	1,993	2,321	79.9	78.2	78.0	20.0	17.5	16.8	16.4
14-24 years	401	636	765	221	375	471	55.2	58.9	61.6	58.7	69.6	20.3	25.7
25-54 years	1,207	1,283	1,466	1,161	1,246	1,426	96.2	97.2	97.2	6.3	7.4	14.3	14.4
55 years and over	516	628	744	315	372	424	61.1	59.2	56.9	21.7	18.0	18.5	13.9
Female													
Total, 14 and over	2,281	2,799	3,287	812	1,068	1,256	35.6	38.2	38.2	22.7	31.5	17.4	17.6
14-24 years	403	647	774	146	235	277	36.3	36.2	35.8	60.4	60.2	19.6	18.1
25-54 years	1,272	1,377	1,562	529	630	710	41.6	45.8	45.5	8.3	19.1	13.4	12.7
55 years and over	606	774	951	136	203	269	22.5	26.3	28.2	27.9	49.1	22.8	32.1
NONWHITE													
Male													
Total, 14 and over	167	220	295	129	174	234	77.2	78.9	79.2	31.8	34.6	34.1	34.7
14-24 years	39	65	100	22	40	62	55.8	60.9	62.7	68.5	84.2	53.0	57.3
25-54 years	99	117	146	90	111	141	90.6	94.9	96.6	18.2	23.9	25.0	27.3
55 years and over	30	38	50	18	23	30	60.5	60.4	61.2	29.0	28.8	29.9	31.6
Female													
Total, 14 and over	187	256	344	91	126	159	48.5	49.4	46.1	36.7	38.5	34.7	25.6
14-24 years	43	72	107	17	31	48	39.2	42.9	44.8	68.4	84.6	48.4	54.9
25-54 years	110	137	175	62	80	92	56.6	58.1	52.5	24.6	27.8	27.0	14.6
55 years and over	34	46	63	11	16	19	33.6	33.8	30.6	36.4	37.3	36.3	23.4

See footnotes at end of table.

TABLE 2. POPULATION AND LABOR FORCE (EXCLUDING ARMED FORCES OVERSEAS), BY AGE, COLOR,[1] AND SEX, FOR REGIONS AND STATES, 1960 AND PROJECTED 1970 AND 1980—Continued

[Numbers in thousands]

Age, color, and sex	Population (July 1)			Labor force (annual average)			Labor force participation rates (percent)			Percent change			
										1960-70		1970-80	
	1960 (April 1)	1970	1980	1960 (April 1)	1970	1980	1960	1970	1980	Population	Labor force	Population	Labor force
	Pennsylvania												
ALL CLASSES													
Both sexes, 14 and over	8,186	8,864	9,688	4,420	4,915	5,449	54.0	55.4	56.2	8.3	11.2	9.3	10.9
Male													
Total, 14 and over	3,914	4,226	4,634	2,997	3,151	3,457	76.6	74.6	74.6	8.0	5.1	9.7	9.7
14-24 years	766	1,043	1,131	395	573	654	51.6	54.9	57.8	36.3	45.1	8.4	14.1
25-54 years	2,142	2,065	2,272	2,033	1,971	2,169	94.9	95.4	95.5	−3.6	−3.0	10.0	10.1
55 years and over	1,006	1,117	1,232	570	606	634	56.6	54.3	51.5	11.0	6.4	10.3	4.5
Female													
Total, 14 and over	4,272	4,639	5,054	1,423	1,765	1,991	33.3	38.0	39.4	8.6	24.0	9.0	12.8
14-24 years	815	1,091	1,170	285	437	485	34.9	40.0	41.5	33.9	53.6	7.2	11.1
25-54 years	2,288	2,162	2,290	898	991	1,087	39.2	45.8	47.5	−5.5	10.4	5.9	9.7
55 years and over	1,169	1,386	1,594	240	337	419	20.6	24.3	26.3	18.5	40.1	15.0	24.3
NONWHITE													
Male													
Total, 14 and over	276	323	397	201	237	299	72.9	73.4	75.4	17.2	17.9	22.7	26.0
14-24 years	60	93	123	29	53	75	48.9	57.1	60.6	54.1	80.1	33.0	41.2
25-54 years	155	162	194	137	147	179	88.5	90.4	92.7	4.5	6.7	19.4	22.4
55 years and over	60	68	80	34	38	45	56.8	54.9	56.0	13.3	9.5	16.4	18.8
Female													
Total, 14 and over	311	371	457	135	182	232	43.3	49.1	50.9	19.5	35.4	23.0	27.4
14-24 years	68	104	136	22	43	61	32.6	41.4	45.0	52.5	93.4	30.6	42.2
25-54 years	179	186	219	94	112	135	52.2	59.9	61.5	4.0	19.4	17.4	20.6
55 years and over	63	81	102	19	28	36	29.9	34.2	35.7	28.1	46.3	26.1	31.9
	East North Central												
ALL CLASSES													
Both sexes, 14 and over	25,330	28,866	33,380	14,128	16,627	19,587	55.8	57.6	58.7	14.0	17.7	15.6	17.8
Male													
Total, 14 and over	12,308	13,954	16,163	9,695	10,857	12,685	78.8	77.8	78.5	13.4	12.0	15.8	16.8
14-24 years	2,530	3,708	4,276	1,467	2,297	2,775	58.0	61.9	64.9	46.6	456.5	15.3	20.8
25-54 years	6,717	6,883	8,128	6,420	6,647	7,846	95.6	96.6	96.5	2.5	3.5	18.1	18.0
55 years and over	3,062	3,363	3,758	1,807	1,914	2,064	59.0	56.9	54.9	9.8	5.9	11.8	7.9
Female													
Total, 14 and over	13,022	14,912	17,217	4,433	5,770	6,902	34.0	38.7	40.1	14.5	30.1	15.5	19.6
14-24 years	2,673	3,879	4,426	913	1,545	1,833	34.1	39.8	41.4	45.1	69.3	14.1	18.6
25-54 years	6,930	7,008	8,101	2,763	3,152	3,721	39.9	45.0	45.9	1.1	14.1	15.6	18.1
55 years and over	3,419	4,025	4,691	758	1,072	1,348	22.2	26.7	28.7	17.7	41.5	16.5	25.6
NONWHITE													
Male													
Total, 14 and over	922	1,144	1,480	686	849	1,119	74.4	74.2	75.6	24.1	23.7	29.4	31.8
14-24 years	196	352	495	98	195	298	49.9	55.4	60.1	79.4	99.2	40.6	52.5
25-54 years	550	576	718	488	534	675	88.8	92.8	94.0	4.7	9.4	24.7	26.3
55 years and over	176	216	267	100	119	147	56.8	55.2	54.9	22.9	19.5	23.6	23.0
Female													
Total, 14 and over	999	1,284	1,680	400	566	750	40.0	44.1	44.6	28.5	41.6	30.8	32.5
14-24 years	226	394	543	68	152	233	29.9	38.5	42.8	74.0	124.3	37.8	53.2
25-54 years	592	650	814	286	345	421	48.4	53.1	51.7	9.7	20.4	25.3	21.9
55 years and over	181	241	323	46	70	97	25.3	28.9	30.0	33.0	52.0	34.2	39.4

See footnotes at end of table.

TABLE 2. POPULATION AND LABOR FORCE (EXCLUDING ARMED FORCES OVERSEAS), BY AGE, COLOR,[1] AND SEX, FOR REGIONS AND STATES, 1960 AND PROJECTED 1970 AND 1980—Continued

[Numbers in thousands]

Age, color, and sex	Population (July 1)			Labor force (annual average)			Labor force participation rates (percent)			Percent change			
										1960–70		1970–80	
	1960 (April 1)	1970	1980	1960 (April 1)	1970	1980	1960	1970	1980	Population	Labor force	Population	Labor force
						Ohio							
ALL CLASSES													
Both sexes, 14 and over	6,767	7,818	9,098	3,724	4,463	5,276	55.0	57.1	58.0	15.5	19.8	16.4	18.2
Male													
Total, 14 and over	3,266	3,760	4,392	2,571	2,937	3,468	78.7	78.1	79.0	15.1	14.2	16.8	18.1
14–24 years	669	1,006	1,149	385	620	743	57.5	61.6	64.7	50.3	61.0	14.3	19.9
25–54 years	1,801	1,879	2,241	1,723	1,817	2,168	95.7	96.7	96.7	4.3	5.5	19.3	19.3
55 years and over	795	876	1,002	463	500	557	58.2	57.1	55.5	10.1	8.0	14.4	11.3
Female													
Total, 14 and over	3,502	4,058	4,706	1,153	1,526	1,808	32.9	37.6	38.4	15.9	32.3	16.0	18.5
14–24 years	721	1,067	1,202	236	402	469	32.7	37.8	39.0	48.0	71.0	12.7	16.5
25–54 years	1,871	1,924	2,242	723	849	986	38.6	44.1	44.0	2.8	17.4	16.5	16.2
55 years and over	909	1,067	1,262	193	273	352	21.3	25.6	27.9	17.3	41.2	18.3	28.8
NONWHITE													
Male													
Total, 14 and over	251	311	399	187	234	307	74.5	75.2	76.9	24.3	25.4	28.0	31.0
14–24 years	52	94	128	27	52	77	50.7	56.1	60.1	77.5	96.5	36.4	46.1
25–54 years	147	157	197	132	148	189	89.4	94.3	95.9	6.9	12.7	25.3	27.4
55 years and over	51	61	74	28	33	41	55.8	54.8	55.4	19.4	17.4	22.0	23.3
Female													
Total, 14 and over	271	347	448	112	157	205	41.3	45.4	45.8	28.0	40.5	29.1	30.5
14–24 years	60	104	140	19	40	59	31.3	38.4	42.0	73.0	112.3	34.3	47.1
25–54 years	159	175	219	80	97	118	50.1	55.4	54.2	10.1	21.8	24.9	22.1
55 years and over	52	68	89	14	20	28	26.1	30.1	31.4	30.8	50.5	32.1	37.9
						Indiana							
ALL CLASSES													
Both sexes, 14 and over	3,251	3,696	4,264	1,802	2,155	2,567	55.4	58.3	60.2	13.7	19.6	15.4	19.1
Male													
Total, 14 and over	1,579	1,798	2,088	1,239	1,400	1,639	78.5	77.9	78.5	13.8	12.9	16.1	17.1
14–24 years	346	488	548	202	305	358	58.3	62.5	65.2	40.9	51.1	12.5	17.4
25–54 years	845	887	1,067	809	857	1,027	95.8	96.6	96.3	5.0	5.9	20.3	19.9
55 years and over	388	423	472	228.	238	254	58.8	56.3	53.8	9.0	4.3	11.7	6.8
Female													
Total, 14 and over	1,672	1,898	2,176	563	756	928	33.7	39.8	42.6	13.5	34.2	14.7	22.7
14–24 years	355	501	560	113	193	228	32.0	38.5	40.8	41.2	69.9	11.7	18.5
25–54 years	871	884	1,024	350	427	528	40.3	48.4	51.6	1.4	21.8	15.8	23.6
55 years and over	445	513	593	99	136	171	22.2	26.5	28.9	15.2	37.6	15.5	26.0
NONWHITE													
Male													
Total, 14 and over	85	104	135	64	79	105	74.9	75.8	77.7	22.5	24.0	29.9	33.2
14–24 years	19	32	45	9	19	29	49.9	57.8	63.6	71.7	98.8	40.2	54.1
25–54 years	48	51	66	44	48	63	90.6	94.7	95.3	5.9	10.8	28.3	29.1
55 years and over	18	20	24	10	12	14	58.6	57.0	56.4	15.0	11.9	17.6	16.4
Female													
Total, 14 and over	92	116	151	37	50	65	40.0	43.2	43.0	26.2	36.3	30.3	29.6
14–24 years	21	36	50	6	13	19	29.2	35.8	38.6	73.2	112.3	38.0	48.7
25–54 years	52	57	72	25	30	37	48.3	52.8	51.3	7.9	18.0	26.6	23.1
55 years and over	18	23	29	5	7	9	28.6	31.2	30.2	25.3	36.7	27.1	22.8

See footnotes at end of table.

TABLE 2. POPULATION AND LABOR FORCE (EXCLUDING ARMED FORCES OVERSEAS), BY AGE, COLOR,[1] AND SEX, FOR REGIONS AND STATES, 1960 AND PROJECTED 1970 AND 1980—Continued

[Numbers in thousands]

Age, color, and sex	Population (July 1)			Labor force (annual average)			Labor force participation rates (percent)			Percent change			
										1960-70		1970-80	
	1960 (April 1)	1970	1980	1960 (April 1)	1970	1980	1960	1970	1980	Population	Labor force	Population	Labor force
	Illinois												
ALL CLASSES													
Both sexes, 14 and over	7,219	8,092	9,302	4,125	4,710	5,476	57.1	58.2	58.9	12.1	14.2	14.9	16.3
Male													
Total, 14 and over	3,496	3,892	4,474	2,776	3,064	3,543	79.4	78.7	79.2	11.3	10.4	15.0	15.6
14-24 years	688	990	1,177	405	624	777	58.9	63.1	66.0	43.8	54.0	18.9	24.6
25-54 years	1,915	1,923	2,222	1,825	1,856	2,151	95.3	96.5	96.8	.4	1.7	15.5	15.9
55 years and over	893	979	1,075	545	584	614	61.1	59.6	57.1	9.6	7.0	9.9	5.3
Female													
Total, 14 and over	3,723	4,200	4.827	1,348	1,646	1,933	36.2	39.2	40.0	12.8	22.1	14.9	17.4
14-24 years	723	1,032	1,215	265	438	529	36.7	42.5	43.5	42.7	65.1	17.7	20.6
25-54 years	1,983	1,980	2,258	839	861	986	42.3	43.5	43.7	-.2	2.7	14.1	14.5
55 years and over	1,017	1,189	1,354	244	346	418	24.0	29.1	30.9	16.9	41.8	14.0	20.7
NONWHITE													
Male													
Total, 14 and over	330	412	550	245	307	417	74.5	74.6	75.9	25.1	25.3	33.3	35.6
14-24 years	71	126	191	38	71	114	52.8	56.4	59.6	77.0	89.2	52.1	60.6
25-54 years	196	210	265	172	195	253	88.1	92.7	95.4	7.5	13.1	25.8	29.5
55 years and over	63	76	93	35	41	50	56.5	54.5	53.9	21.2	16.9	22.9	21.6
Female													
Total, 14 and over	366	470	629	152	213	278	41.5	45.2	44.2	28.5	40.1	33.8	30.8
14-24 years	84	142	210	27	62	101	31.9	43.8	48.0	69.1	132.7	48.3	62.4
25-54 years	215	241	303	108	126	144	50.2	52.2	47.5	12.2	16.6	25.6	14.5
55 years and over	67	87	116	17	25	33	25.6	28.3	28.7	30.0	44.0	32.7	34.4
	Michigan												
ALL CLASSES													
Both sexes, 14 and over	5,350	6,144	7,097	2,944	3,477	4,103	55.0	56.6	57.8	14.9	18.1	15.5	18.0
Male													
Total, 14 and over	2,620	2,983	3,437	2,051	2,278	2,652	78.3	76.4	77.2	13.9	11.1	15.2	16.4
14-24 years	547	819	929	308	487	582	56.3	59.5	62.7	49.6	58.2	13.5	19.4
25-54 years	1,451	1,468	1,717	1,386	1,415	1,653	95.5	96.4	96.2	1.2	2.1	17.0	16.8
55 years and over	621	696	790	357	376	417	57.5	54.0	52.8	12.0	5.2	13.6	11.0
Female													
Total, 14 and over	2,730	3,162	3,660	893	1,199	1,451	32.7	37.9	39.7	15.8	34.2	15.8	21.1
14-24 years	585	858	963	195	332	391	33.3	38.6	40.6	46.6	70.4	12.3	18.0
25-54 years	1,490	1,504	1,728	565	673	805	37.9	44.8	46.6	.9	19.2	14.9	19.6
55 years and over	655	800	968	134	194	255	20.4	24.2	26.3	22.1	44.9	21.1	31.6
NONWHITE													
Male													
Total, 14 and over	230	277	337	170	199	245	73.9	71.7	72.7	20.6	17.0	21.7	23.4
14-24 years	47	87	109	21	45	65	44.1	52.3	60.0	85.5	120.0	25.2	43.6
25-54 years	142	136	160	125	123	142	88.4	90.5	89.0	-4.3	-2.1	17.5	15.6
55 years and over	41	54	69	24	30	38	57.7	55.9	55.0	32.6	28.5	26.8	24.7
Female													
Total, 14 and over	243	309	387	88	128	173	36.4	41.3	44.7	27.0	44.3	25.3	35.5
14-24 years	54	97	119	14	32	45	25.7	32.5	37.5	78.9	125.9	23.0	42.0
25-54 years	149	154	187	66	80	104	44.0	52.0	55.4	3.6	22.4	21.3	29.2
55 years and over	40	58	80	9	16	25	22.3	27.6	30.5	43.6	77.7	39.8	54.7

See footnotes at end of table.

Table 2. Population and Labor Force (Excluding Armed Forces Overseas), by Age, Color,[1] and Sex, for Regions and States, 1960 and Projected 1970 and 1980—Continued

[Numbers in thousands]

Age, color, and sex	Population (July 1)			Labor force (annual average)			Labor force participation rates (percent)			Percent change			
										1960-70		1970-80	
	1960 (April 1)	1970	1980	1960 (April 1)	1970	1980	1960	1970	1980	Population	Labor force	Population	Labor force
	Wisconsin												
All Classes													
Both sexes, 14 and over	2,744	3,116	3,619	1,533	1,822	2,165	55.9	58.5	59.8	13.6	18.9	16.1	18.8
Male													
Total, 14 and over	1,348	1,521	1,771	1,057	1,178	1,383	78.4	77.4	78.1	12.9	11.5	16.4	17.4
14-24 years	279	407	473	167	260	314	59.9	64.0	66.5	45.6	55.6	16.3	20.8
25-54 years	704	725	881	677	701	847	96.1	96.7	96.2	3.0	3.6	21.4	20.8
55 years and over	364	390	418	213	217	222	58.4	55.6	53.1	6.9	1.8	7.3	2.4
Female													
Total, 14 and over	1,396	1,595	1,848	476	644	782	34.1	40.4	42.3	14.2	35.2	15.9	21.5
14-24 years	289	421	486	103	180	215	35.8	42.6	44.3	45.8	73.8	15.3	19.9
25-54 years	714	717	848	285	341	415	39.9	47.6	49.0	.3	19.5	18.3	21.8
55 years and over	393	457	514	88	124	152	22.3	27.1	29.5	16.3	40.9	12.5	22.8
	West North Central												
All Classes													
Both sexes, 14 and over	10,827	11,808	13,179	5,919	6,772	7,774	54.7	57.3	59.0	9.1	14.4	11.6	14.8
Male													
Total, 14 and over	5,280	5,729	6,411	4,092	4,393	4,965	77.5	76.7	77.4	8.5	7.4	11.9	13.0
14-24 years	1,121	1,565	1,731	676	1,011	1,148	60.3	64.6	66.3	39.6	49.5	10.6	13.5
25-54 years	2,691	2,663	3,134	2,562	2,554	3,002	95.2	95.9	95.8	−1.0	−.3	17.7	17.6
55 years and over	1,468	1,501	1,545	853	828	815	58.1	55.2	52.8	2.2	−2.9	3.0	−1.5
Female													
Total, 14 and over	5,547	6,079	6,767	1,828	2,379	2,809	33.0	39.1	41.5	9.6	30.2	11.3	18.1
14-24 years	1,137	1,574	1,731	399	670	778	35.1	42.6	44.9	38.4	67.8	10.0	16.2
25-54 years	2,758	2,687	3,081	1,059	1,223	1,473	38.4	45.5	47.8	−2.6	15.5	14.7	20.4
55 years and over	1,652	1,819	1,956	369	486	559	22.4	26.7	28.6	10.1	31.6	7.5	14.9
Nonwhite													
Male													
Total, 14 and over	201	237	304	138	170	226	68.6	71.8	74.3	18.1	23.6	28.2	32.7
14-24 years	48	79	111	24	46	67	49.3	58.3	60.5	62.9	92.7	41.2	46.4
25-54 years	104	109	141	89	99	133	85.8	91.4	94.4	4.7	11.6	29.3	33.5
55 years and over	49	50	53	25	25	26	51.0	49.9	49.5	2.4	.3	5.5	4.4
Female													
Total, 14 and over	218	264	338	86	114	148	39.5	43.4	43.9	21.0	32.8	28.3	29.8
14-24 years	50	82	115	14	27	40	28.1	33.0	34.5	63.6	92.3	40.5	46.7
25-54 years	117	124	157	58	70	89	49.8	56.5	56.7	6.2	20.5	26.2	26.6
55 years and over	51	58	67	14	17	20	27.2	29.9	30.1	13.1	24.3	15.5	16.8
	Minnesota												
All Classes													
Both sexes, 14 and over	2,344	2,652	3,098	1,304	1,544	1,841	55.6	58.2	59.4	13.1	18.4	16.8	19.2
Male													
Total, 14 and over	1,148	1,292	1,515	893	999	1,191	77.8	77.3	78.6	12.6	11.9	17.2	19.2
14-24 years	241	353	408	145	224	267	60.0	63.6	65.5	46.1	54.9	15.7	19.3
25-54 years	592	615	761	566	593	733	95.7	96.4	96.4	3.8	4.7	23.8	23.7
55 years and over	315	325	346	182	182	190	57.7	56.0	54.9	3.3	.2	6.4	4.3
Female													
Total, 14 and over	1,196	1,359	1,583	411	545	651	34.4	40.1	41.1	13.6	32.5	16.5	19.4
14-24 years	259	372	427	104	171	204	40.0	46.0	47.7	43.7	65.1	14.9	19.1
25-54 years	598	605	732	227	264	317	37.9	43.6	43.4	1.1	16.2	20.9	20.3
55 years and over	340	383	424	81	110	130	23.8	28.8	30.6	12.7	36.6	10.9	17.6

See footnotes at end of table.

TABLE 2. POPULATION AND LABOR FORCE (EXCLUDING ARMED FORCES OVERSEAS), BY AGE, COLOR,[1] AND SEX, FOR REGIONS AND STATES, 1960 AND PROJECTED 1970 AND 1980—Continued

[Numbers in thousands]

Age, color, and sex	Population (July 1)			Labor force (annual average)			Labor force participation rates (percent)			Percent change			
										1960-70		1970-80	
	1960 (April 1)	1970	1980	1960 (April 1)	1970	1980	1960	1970	1980	Population	Labor force	Population	Labor force
	Iowa												
ALL CLASSES													
Both sexes, 14 and over	1,941	2,051	2,248	1,054	1,189	1,352	54.3	58.0	60.1	5.6	12.7	9.6	13.8
Male													
Total, 14 and over	943	996	1,100	736	775	866	78.1	77.9	78.8	5.7	5.3	10.5	11.7
14-24 years	197	262	279	123	177	194	62.6	67.7	69.4	33.1	43.8	6.5	9.3
25-54 years	474	465	548	455	448	523	95.9	96.2	95.5	−1.9	−1.6	17.8	16.9
55 years and over	271	268	273	158	150	149	58.3	56.0	54.7	−1.0	−4.9	1.6	−.7
Female													
Total, 14 and over	999	1,055	1,148	318	413	486	31.9	39.2	42.3	5.6	29.8	8.8	17.6
14-24 years	203	269	286	70	118	134	34.7	44.0	46.8	32.6	68.3	6.2	12.9
25-54 years	485	458	518	179	206	249	36.9	45.0	48.2	−5.6	15.1	12.9	21.0
55 years and over	310	327	345	68	88	102	22.1	27.0	29.8	5.5	29.1	5.2	15.9
	Missouri												
ALL CLASSES													
Both sexes, 14 and over	3,118	3,346	3,712	1,673	1,838	2,083	53.7	54.9	56.1	7.3	9.8	10.9	13.4
Male													
Total, 14 and over	1,496	1,595	1,776	1,133	1,179	1,320	75.7	73.9	74.3	6.6	4.0	11.4	12.0
14-24 years	312	422	475	181	256	295	58.1	60.7	62.2	35.1	41.2	12.7	15.4
25-54 years	760	736	853	716	697	811	94.1	94.8	95.1	−3.3	−2.6	16.0	16.3
55 years and over	424	437	447	236	225	213	55.7	51.5	47.6	3.3	−4.5	2.3	−5.5
Female													
Total, 14 and over	1.621	1,751	1,936	540	659	763	33.3	37.6	39.4	8.0	22.0	10.6	15.8
14-24 years	313	426	476	102	164	195	32.5	38.5	41.0	36.1	61.2	11.7	18.8
25-54 years	810	775	874	332	362	423	41.0	46.7	48.3	−4.3	9.0	12.8	16.6
55 years and over	498	550	586	106	133	146	21.3	24.1	24.9	10.4	24.9	6.6	9.9
NONWHITE													
Male													
Total, 14 and over	122	141	179	85	102	135	69.6	72.5	75.4	16.3	21.2	26.6	31.6
14-24 years	27	44	63	13	25	38	49.6	57.3	60.3	64.7	90.3	41.4	48.9
25-54 years	63	64	82	55	61	80	87.3	94.2	97.6	1.6	9.7	27.7	32.4
55 years and over	31	32	34	16	16	17	50.8	50.3	49.1	4.1	3.0	4.0	1.5
Female													
Total, 14 and over	139	164	206	57	73	93	41.2	44.4	45.0	18.1	27.4	25.7	27.4
14-24 years	30	49	68	9	15	21	28.4	29.9	30.7	60.4	68.7	39.8	43.5
25-54 years	75	77	94	40	47	59	52.7	61.0	62.6	2.3	18.5	22.2	25.4
55 years and over	33	39	44	9	11	13	26.9	29.7	29.8	15.4	27.0	15.0	15.4
	North Dakota												
ALL CLASSES													
Both sexes, 14 and over	426	469	520	231	269	306	54.2	57.3	58.9	10.2	16.6	10.7	13.7
Male													
Total, 14 and over	218	240	265	167	180	198	76.9	75.1	74.8	10.3	7.7	10.3	9.7
14-24 years	52	70	75	30	41	44	57.0	58.8	58.0	34.7	39.2	7.0	5.4
25-54 years	110	111	130	105	106	123	95.3	95.2	94.6	.9	.8	16.9	16.1
55 years and over	55	58	59	33	33	31	59.1	56.6	52.6	5.8	1.3	1.4	−5.7
Female													
Total, 14 and over	208	229	255	63	89	108	30.3	38.6	42.4	10.1	40.2	11.3	22.0
14-24 years	50	66	70	17	28	31	33.6	42.6	44.7	31.6	67.0	6.7	12.1
25-54 years	105	102	118	35	43	56	33.2	42.2	47.8	−3.3	23.0	15.6	30.7
55 years and over	53	61	67	11	17	20	21.5	28.4	30.3	16.3	53.4	9.0	16.4

See footnotes at end of table.

TABLE 2. POPULATION AND LABOR FORCE (EXCLUDING ARMED FORCES OVERSEAS), BY AGE, COLOR,[1] AND SEX, FOR REGIONS AND STATES, 1960 AND PROJECTED 1970 AND 1980—Continued

[Numbers in thousands]

Age, color, and sex	Population (July 1)			Labor force (annual average)			Labor force participation rates (percent)			Percent change			
										1960-70		1970-80	
	1960 (April 1)	1970	1980	1960 (April 1)	1970	1980	1960	1970	1980	Population	Labor force	Population	Labor force
	South Dakota												
ALL CLASSES													
Both sexes, 14 and over	463	523	575	254	301	341	54.7	57.6	59.2	12.9	18.8	10.0	13.2
Male													
Total, 14 and over	233	261	286	181	199	218	77.7	76.5	76.3	11.6	9.9	9.9	9.7
14-24 years	52	76	83	31	49	52	60.1	63.8	63.1	45.6	54.7	8.4	7.2
25-54 years	117	119	137	111	113	129	95.4	95.6	94.8	1.9	2.0	15.3	14.4
55 years and over	65	66	67	39	37	37	59.8	56.6	54.7	1.6	−3.8	1.8	−1.6
Female													
Total, 14 and over	230	263	289	72	102	122	31.5	38.8	42.4	14.3	41.1	10.1	20.1
14-24 years	51	74	79	17	31	34	33.8	41.5	43.4	46.4	80.0	6.7	11.3
25-54 years	114	115	132	40	51	65	35.3	44.0	49.1	1.0	26.0	14.1	27.5
55 years and over	65	73	78	15	20	23	23.0	28.0	29.9	12.6	37.2	7.4	14.9
	Nebraska												
ALL CLASSES													
Both sexes, 14 and over	996	1,104	1,204	556	652	735	55.9	59.1	61.1	10.8	17.2	9.0	12.6
Male													
Total, 14 and over	488	537	587	388	424	468	79.5	78.9	79.7	10.1	9.3	9.2	10.3
14-24 years	102	148	162	64	102	115	62.8	68.5	70.9	44.8	57.9	9.0	12.9
25-54 years	247	250	286	238	242	277	96.2	96.8	96.6	1.2	1.8	14.6	14.4
55 years and over	139	139	139	86	81	76	61.9	57.9	55.1	.4	−6.2	−.4	−5.2
Female													
Total, 14 and over	508	566	617	168	228	267	33.2	40.3	43.3	11.5	35.5	8.9	17.0
14-24 years	103	147	158	38	65	74	36.8	44.3	46.8	42.8	71.9	7.9	13.9
25-54 years	250	250	281	95	116	140	37.8	46.3	50.0	--------	22.3	12.2	21.2
55 years and over	155	170	178	36	48	53	23.2	28.0	29.7	9.2	31.8	4.9	11.0
	Kansas												
ALL CLASSES													
Both sexes, 14 and over	1,538	1,665	1,822	847	980	1,117	55.1	58.8	61.3	8.2	15.6	9.5	14.0
Male													
Total, 14 and over	754	809	883	593	636	704	78.7	78.7	79.8	7.2	7.3	9.1	10.7
14-24 years	164	234	249	102	162	181	62.1	69.3	72.5	43.0	59.6	6.6	11.5
25-54 years	390	368	419	371	355	405	95.2	96.3	96.5	−5.6	−4.5	13.8	14.1
55 years and over	200	206	214	120	120	119	60.0	58.0	55.6	3.1	−.5	3.7	−.5
Female													
Total, 14 and over	784	856	940	254	343	412	32.4	40.1	43.9	9.1	35.1	9.8	20.1
14-24 years	159	220	235	52	92	106	32.5	42.0	45.1	38.7	79.0	6.6	14.6
25-54 years	394	381	428	151	182	222	38.3	47.7	52.0	−3.5	20.2	12.3	22.4
55 years and over	231	255	277	51	69	84	22.3	27.2	30.3	10.4	34.6	8.9	21.4

See footnotes at end of table.

TABLE 2. POPULATION AND LABOR FORCE (EXCLUDING ARMED FORCES OVERSEAS), BY AGE, COLOR,[1] AND SEX, FOR REGIONS AND STATES, 1960 AND PROJECTED 1970 AND 1980—Continued

[Numbers in thousands]

Age, color, and sex	Population (July 1)			Labor force (annual average)			Labor force participation rates (percent)			Percent change			
										1960-70		1970-80	
	1960 (April 1)	1970	1980	1960 (April 1)	1970	1980	1960	1970	1980	Population	Labor force	Population	Labor force
	South Atlantic												
ALL CLASSES													
Both sexes, 14 and over	18,036	22,224	26,411	9,963	12,671	15,186	55.2	57.0	57.5	23.2	27.2	18.8	19.9
Male													
Total, 14 and over	8,764	10,718	12,686	6,636	8,033	9,420	75.7	75.0	74.2	22.3	21.1	18.4	17.3
14-24 years	2,168	3,226	3,679	1,243	1,986	2,229	57.3	61.6	60.6	48.8	59.8	14.0	12.2
25-54 years	4,713	5,091	6,145	4,394	4,809	5,812	93.2	94.5	94.6	8.0	9.5	20.7	20.9
55 years and over	1,882	2,401	2,863	999	1,238	1,379	53.1	51.6	48.2	27.5	23.9	19.2	11.4
Female													
Total, 14 and over	9,272	11,506	13,724	3,327	4,637	5,767	35.9	40.3	42.0	24.1	39.4	19.3	24.4
14-24 years	2,083	3,048	3,482	626	1,130	1,351	30.0	37.1	38.8	46.3	80.5	14.3	19.6
25-54 years	4,970	5,486	6,510	2,237	2,792	3,460	45.0	50.9	53.2	10.4	24.8	18.7	23.9
55 years and over	2,219	2,973	3,732	463	716	956	20.9	24.1	25.6	34.0	54.5	25.5	33.4
NONWHITE													
Male													
Total, 14 and over	1,776	2,203	2,737	1,275	1,636	2,022	71.8	74.2	73.9	24.1	28.3	24.2	23.6
14-24 years	508	760	922	267	468	556	52.6	61.5	60.3	49.6	75.0	21.3	18.9
25-54 years	932	1,041	1,353	826	949	1,230	88.6	91.2	90.9	11.7	15.0	29.9	29.6
55 years and over	336	402	462	182	219	236	54.3	54.5	51.1	19.9	20.3	14.9	7.6
Female													
Total, 14 and over	1,950	2,386	2,916	847	1,112	1,341	43.4	46.6	46.0	22.4	31.4	22.2	20.6
14-24 years	513	777	939	144	279	341	28.1	35.9	36.3	51.6	93.1	20.8	22.3
25-54 years	1,045	1,124	1,392	591	680	825	56.6	60.5	59.3	7.6	15.1	23.8	21.3
55 years and over	392	485	585	111	153	175	28.4	31.6	29.9	23.6	37.5	20.7	14.3
	Delaware												
ALL CLASSES													
Both sexes, 14 and over	309	385	472	178	224	275	57.5	58.1	58.2	24.6	26.0	22.6	22.7
Male													
Total, 14 and over	151	186	227	121	146	177	80.2	78.2	77.9	23.2	20.1	22.0	21.6
14-24 years	31	53	67	18	33	43	57.4	61.4	64.3	70.4	82.2	[illegible]	30.9
25-54 years	87	93	111	84	90	107	95.8	96.5	96.2	6.4	7.2	19.4	19.1
55 years and over	32	40	49	19	23	27	60.0	57.8	55.0	23.1	18.6	23.9	18.0
Female													
Total, 14 and over	158	199	245	57	78	98	35.8	39.4	40.0	25.9	38.7	23.2	24.8
14-24 years	32	53	65	10	19	23	32.0	35.8	35.9	63.0	82.4	24.1	24.2
25-54 years	89	98	118	37	46	56	42.0	46.8	47.0	10.9	23.6	20.1	20.6
55 years and over	37	48	62	9	14	19	24.2	28.2	30.7	29.5	50.9	28.6	40.1

See footnotes at end of table.

TABLE 2. POPULATION AND LABOR FORCE (EXCLUDING ARMED FORCES OVERSEAS), BY AGE, COLOR,[1] AND SEX, FOR REGIONS AND STATES, 1960 AND PROJECTED 1970 AND 1980—Continued

[Numbers in thousands]

Age, color, and sex	Population (July 1)			Labor force (annual average)			Labor force participation rates (percent)			Percent change			
										1960-70		1970-80	
	1960 (April 1)	1970	1980	1960 (April 1)	1970	1980	1960	1970	1980	Population	Labor force	Population	Labor force
	Maryland												
ALL CLASSES													
Both sexes, 14 and over	2,155	2,717	3,282	1,242	1,596	1,922	57.6	58.7	58.6	26.1	28.5	20.8	20.4
Male													
Total, 14 and over	1,053	1,314	1,579	843	1,032	1,231	80.0	78.5	77.9	24.8	22.4	20.1	19.3
14-24 years	233	381	454	134	234	282	57.6	61.5	62.1	63.3	74.4	19.2	20.3
25-54 years	607	655	779	578	631	749	95.1	96.2	96.1	7.9	9.2	18.9	18.8
55 years and over	213	278	346	131	167	199	61.5	59.9	57.7	30.7	27.4	24.2	19.6
Female													
Total, 14 and over	1,102	1,402	1,703	399	564	692	36.2	40.2	40.6	27.3	41.3	21.4	22.6
14-24 years	230	371	442	75	138	167	32.5	37.0	37.8	61.7	84.5	19.0	21.5
25-54 years	621	694	820	267	338	402	43.0	48.7	49.0	11.7	26.5	18.0	18.9
55 years and over	251	337	441	58	89	123	23.0	26.4	27.8	34.3	54.1	30.9	38.3
NONWHITE													
Male													
Total, 14 and over	167	211	271	123	159	207	73.8	75.1	76.4	26.9	29.1	28.3	30.4
14-24 years	41	67	91	21	43	63	51.2	63.1	69.1	64.0	102.2	34.3	47.0
25-54 years	94	105	133	84	94	119	88.8	90.0	89.6	11.4	12.9	26.6	26.0
55 years and over	31	39	48	18	22	25	58.4	55.7	53.2	25.2	19.3	22.4	17.0
Female													
Total, 14 and over	174	225	290	78	106	128	45.0	46.9	44.3	29.3	34.7	28.9	21.6
14-24 years	43	71	93	13	26	35	29.5	36.6	37.7	65.6	105.3	32.1	36.1
25-54 years	100	112	141	56	65	75	55.8	58.2	53.4	12.4	17.3	25.3	15.0
55 years and over	32	42	56	10	14	18	31.9	34.0	32.1	33.3	42.2	33.0	25.4
	District of Columbia												
ALL CLASSES													
Both sexes, 14 and over	579	636	739	369	403	474	63.7	63.4	64.0	10.0	9.4	16.2	17.4
Male													
Total, 14 and over	265	291	343	206	224	264	77.6	77.0	77.0	9.7	8.8	17.7	17.6
14-24 years	56	76	95	33	46	58	59.2	61.2	61.3	35.6	40.0	24.9	25.2
25-54 years	148	147	176	136	139	167	91.8	94.2	95.0	−.5	2.2	19.5	20.4
55 years and over	61	68	72	37	39	38	60.3	57.4	53.5	10.6	5.3	5.7	−1.5
Female													
Total, 14 and over	313	345	397	163	179	210	51.9	51.9	52.9	10.2	10.1	15.0	17.1
14-24 years	62	84	103	26	41	51	42.0	48.3	49.6	35.9	56.3	21.9	25.4
25-54 years	167	166	190	107	107	126	64.1	64.6	66.1	−1.0	−.3	14.9	17.6
55 years and over	84	95	104	29	32	33	35.0	33.0	31.8	13.5	7.1	8.9	5.0
NONWHITE													
Male													
Total, 14 and over	133	173	228	104	135	177	78.5	77.9	77.6	30.7	29.7	31.4	30.8
14-24 years	28	49	70	16	28	41	55.3	57.5	58.9	74.4	81.3	41.8	45.3
25-54 years	82	93	118	75	88	113	91.6	94.4	95.5	12.7	16.2	27.1	28.5
55 years and over	22	31	40	13	19	23	59.3	60.9	57.1	42.1	45.9	27.7	19.7
Female													
Total, 14 and over	151	197	253	80	106	138	52.7	53.9	54.5	30.2	33.2	28.9	30.3
14-24 years	33	55	76	11	24	36	34.4	43.8	46.9	67.1	112.9	37.8	47.6
25-54 years	92	103	126	59	67	84	64.3	65.2	67.3	12.3	13.9	21.5	25.5
55 years and over	26	38	52	9	14	18	35.0	37.9	34.5	46.9	59.1	35.9	23.9

See footnotes at end of table.

Table 2. Population and Labor Force (Excluding Armed Forces Overseas), by Age, Color,[1] and Sex, for Regions and States, 1960 and Projected 1970 and 1980—Continued

[Numbers in thousands]

Age, color, and sex	Population (July 1)			Labor force (annual average)			Labor force participation rates (percent)			Percent change			
										1960-70		1970-80	
	1960 (April 1)	1970	1980	1960 (April 1)	1970	1980	1960	1970	1980	Population	Labor force	Population	Labor force
	Virginia												
All Classes													
Both sexes, 14 and over	2,753	3,371	3,937	1,533	1,928	2,276	55.7	57.2	57.8	22.5	25.8	16.8	18.1
Male													
Total, 14 and over	1,361	1,629	1,880	1,059	1,234	1,398	77.8	75.8	74.4	19.7	16.5	15.4	13.3
14-24 years	351	529	594	209	329	357	59.5	62.1	60.0	50.9	57.4	12.3	8.6
25-54 years	747	766	895	698	721	843	93.4	94.2	94.1	2.5	3.4	17.0	16.9
55 years and over	263	334	390	153	184	198	58.0	55.2	50.8	27.0	20.8	16.8	7.4
Female													
Total, 14 and over	1,393	1,743	2,057	474	694	878	34.0	39.8	42.7	25.1	46.4	18.0	26.7
14-24 years	319	475	533	91	167	197	28.5	35.2	37.0	48.9	83.9	12.2	17.8
25-54 years	760	857	1,004	316	419	529	41.5	48.8	52.7	12.8	32.7	17.1	26.4
55 years and over	313	410	520	67	107	152	21.5	26.2	29.3	31.0	60.0	26.8	41.6
Nonwhite													
Male													
Total, 14 and over	262	309	367	185	225	271	70.4	72.6	73.9	17.9	21.6	18.7	20.7
14-24 years	69	103	121	35	62	74	50.5	60.0	61.3	48.5	76.3	17.4	19.9
25-54 years	140	146	177	122	130	161	86.7	89.6	91.3	3.8	7.3	21.5	23.7
55 years and over	53	61	69	28	32	36	53.0	53.3	51.6	15.1	15.7	14.1	10.3
Female													
Total, 14 and over	271	325	385	106	135	158	39.0	41.7	40.9	19.9	28.1	18.7	16.4
14-24 years	68	102	120	16	29	34	24.3	28.8	28.6	50.4	78.7	17.3	16.4
25-54 years	145	154	184	74	85	97	50.9	55.0	52.8	6.1	14.7	19.3	14.6
55 years and over	58	69	82	16	21	26	26.8	31.2	32.2	18.7	38.2	19.4	23.5
	West Virginia												
All Classes													
Both sexes, 14 and over	1,295	1,334	1,399	588	671	731	45.4	50.3	52.3	3.0	14.1	4.9	8.9
Male													
Total, 14 and over	627	648	684	426	457	491	67.8	70.6	71.8	3.3	7.4	5.6	7.4
14-24 years	145	173	163	59	90	88	40.8	52.5	54.0	18.9	52.7	−5.8	−3.0
25-54 years	322	305	344	290	287	324	89.9	93.9	94.3	−5.3	−1.0	12.7	13.2
55 years and over	160	170	178	77	80	79	47.9	47.0	44.4	6.2	4.1	4.4	−1.3
Female													
Total, 14 and over	668	686	715	162	214	240	24.3	31.2	33.6	2.7	31.8	4.2	12.2
14-24 years	151	174	164	32	52	56	21.2	30.0	34.3	15.4	63.2	−5.6	7.9
25-54 years	349	314	330	104	122	135	29.7	38.8	41.0	−10.0	17.7	4.9	10.8
55 years and over	168	198	221	27	40	49	15.9	20.2	22.0	17.5	49.1	−11.8	21.8

See footnotes at end of table.

TABLE 2. POPULATION AND LABOR FORCE (EXCLUDING ARMED FORCES OVERSEAS), BY AGE, COLOR,[1] AND SEX, FOR REGIONS AND STATES, 1960 AND PROJECTED 1970 AND 1980—Continued

[Numbers in thousands]

Age, color, and sex	Population (July 1)			Labor force (annual average)			Labor force participation rates (percent)			Percent change			
										1960-70		1970-80	
	1960 (April 1)	1970	1980	1960 (April 1)	1970	1980	1960	1970	1980	Population	Labor force	Population	Labor force
	North Carolina												
ALL CLASSES													
Both sexes, 14 and over	3,119	3,693	4,210	1,754	2,145	2,444	56.3	58.1	58.1	18.4	22.2	14.0	14.0
Male													
Total, 14 and over	1,518	1,794	2,041	1,154	1,345	1,500	76.1	74.9	73.5	18.2	16.5	13.8	11.6
14-24 years	417	565	600	235	342	353	56.4	60.5	58.8	35.4	45.4	6.3	3.3
25-54 years	813	865	1,005	754	809	936	92.8	93.5	93.1	6.4	7.3	16.2	15.7
55 years and over	288	364	436	165	194	211	57.2	53.1	48.4	26.6	17.5	19.6	9.0
Female													
Total, 14 and over	1,601	1,899	2,168	600	800	944	37.5	42.1	43.5	18.6	33.3	14.2	18.0
14-24 years	394	527	559	116	189	201	29.5	35.8	35.9	33.7	62.3	6.1	6.5
25-54 years	863	919	1,053	411	496	593	47.6	54.0	56.3	6.5	20.7	14.5	19.4
55 years and over	343	453	556	73	115	150	21.1	25.4	27.0	31.9	58.7	22.9	30.7
NONWHITE													
Male													
Total, 14 and over	337	416	498	234	306	366	69.4	73.4	73.5	23.4	30.7	19.6	19.7
14-24 years	107	154	168	52	95	105	49.0	61.6	62.2	44.7	81.9	8.9	10.0
25-54 years	169	189	246	148	170	219	87.4	90.3	89.1	11.3	15.1	30.6	28.8
55 years and over	61	73	83	34	40	42	55.0	55.0	50.6	19.7	19.9	13.7	4.4
Female													
Total, 14 and over	371	446	524	148	194	225	40.0	43.5	42.9	20.5	30.9	17.4	15.8
14-24 years	105	155	169	25	47	49	23.6	30.1	28.8	47.9	89.0	9.2	4.4
25-54 years	194	202	249	103	118	142	53.3	58.5	57.0	4.6	14.8	23.1	20.0
55 years and over	72	89	106	20	29	34	28.4	32.6	32.1	23.2	41.8	18.7	16.7
	South Carolina												
ALL CLASSES													
Both sexes, 14 and over	1,579	1,897	2,183	896	1,109	1,270	56.7	58.5	58.2	20.1	23.7	15.1	14.6
Male													
Total, 14 and over	769	920	1,060	585	695	784	76.2	75.6	74.0	19.7	18.8	15.2	12.8
14-24 years	233	321	341	139	207	212	59.4	64.5	62.3	37.5	49.5	6.2	2.6
25-54 years	403	426	511	373	398	472	92.7	93.2	92.4	5.9	6.6	19.8	18.8
55 years and over	133	172	208	74	91	100	55.6	52.6	48.0	30.2	23.2	20.5	9.9
Female													
Total, 14 and over	811	977	1,124	311	413	486	38.3	42.3	43.2	20.5	32.9	15.0	17.6
14-24 years	210	290	306	63	109	120	29.8	37.7	39.3	38.1	74.4	5.6	10.1
25-54 years	431	466	544	211	251	301	49.0	53.9	55.3	8.1	19.1	16.6	19.6
55 years and over	170	220	274	37	53	65	21.9	23.9	23.8	29.9	41.7	24.2	23.6
NONWHITE													
Male													
Total, 14 and over	230	284	339	159	206	240	68.9	72.6	70.6	23.3	29.8	19.7	16.5
14-24 years	80	112	120	41	69	67	51.6	61.1	55.7	40.1	66.0	6.9	−2.5
25-54 years	110	125	166	96	112	147	87.8	90.1	88.0	13.7	16.8	33.7	30.6
55 years and over	40	47	53	21	25	26	52.3	53.3	49.7	15.9	18.1	12.9	5.4
Female													
Total, 14 and over	262	310	357	102	133	154	38.8	42.8	43.0	18.1	30.5	15.4	15.9
14-24 years	78	112	118	20	39	43	25.7	35.0	36.8	42.4	93.9	5.7	11.1
25-54 years	130	137	169	68	78	94	52.3	56.8	55.8	5.2	14.3	23.2	21.1
55 years and over	53	61	70	13	16	16	25.1	25.7	22.7	14.0	17.0	15.5	1.9

See footnotes at end of table.

TABLE 2. POPULATION AND LABOR FORCE (EXCLUDING ARMED FORCES OVERSEAS), BY AGE, COLOR,[1] AND SEX, FOR REGIONS AND STATES, 1960 AND PROJECTED 1970 AND 1980—Continued

[Numbers in thousands]

Age, color, and sex	Population (July 1)			Labor force (annual average)			Labor force participation rates (percent)			Percent change			
										1960-70		1970-80	
	1960 (April 1)	1970	1980	1960 (April 1)	1970	1980	1960	1970	1980	Population	Labor force	Population	Labor force
	Georgia												
ALL CLASSES													
Both sexes, 14 and over	2,688	3,275	3,792	1,516	1,924	2,228	56.4	58.7	58.6	21.8	26.9	15.8	15.8
Male													
Total, 14 and over	1,290	1,576	1,824	990	1,189	1,348	76.8	75.5	73.9	22.2	20.1	15.7	13.3
14-24 years	340	499	554	202	311	328	59.5	62.2	59.3	46.8	53.4	10.9	5.7
25-54 years	695	756	897	647	710	843	93.0	94.0	93.9	8.8	9.9	18.7	18.7
55 years and over	255	321	373	141	169	177	55.5	52.5	47.4	25.8	19.2	16.2	4.9
Female													
Total, 14 and over	1,398	1,699	1,968	525	734	880	37.6	43.2	44.7	21.5	39.8	15.8	19.8
14-24 years	333	472	523	103	182	198	31.0	38.5	37.9	41.7	75.7	10.8	9.2
25-54 years	743	816	951	353	447	549	47.5	54.9	57.8	9.7	26.6	16.5	22.8
55 years and over	321	411	494	69	105	132	21.4	25.6	26.7	27.9	53.1	20.1	25.5
NONWHITE													
Male													
Total, 14 and over	322	395	480	229	294	350	71.2	74.4	73.0	22.8	28.5	21.5	19.1
14-24 years	97	142	166	54	92	99	55.8	64.5	59.8	45.7	68.2	16.8	8.4
25-54 years	160	180	236	141	165	215	88.5	91.5	91.0	12.5	16.4	31.2	30.4
55 years and over	65	74	77	33	38	37	51.5	52.0	46.7	13.7	14.7	6.8	−4.1
Female													
Total, 14 and over	379	448	526	163	209	238	42.9	46.7	45.2	18.1	28.6	17.5	13.7
14-24 years	100	145	168	29	51	53	29.3	35.2	31.2	44.4	73.5	16.0	3.0
25-54 years	195	204	248	111	129	156	57.1	63.3	62.8	4.7	16.1	21.6	20.6
55 years and over	84	99	111	22	29	30	26.3	29.4	26.8	17.8	31.5	11.4	1.6
	Florida												
ALL CLASSES													
Both sexes, 14 and over	3,558	4,916	6,397	1,887	2,672	3,566	53.0	54.3	55.8	38.1	41.6	30.1	33.5
Male													
Total, 14 and over	1,729	2,359	3,049	1,251	1,711	2,228	72.4	72.5	73.1	36.4	36.8	29.2	30.2
14-24 years	361	629	812	213	394	508	59.2	62.7	62.6	74.4	84.7	29.0	28.9
25-54 years	891	1,077	1,425	835	1,025	1,370	93.7	95.2	96.1	20.9	22.8	32.3	33.7
55 years and over	478	653	812	203	292	349	42.5	44.7	43.0	36.8	44.1	24.3	19.5
Female													
Total, 14 and over	1,829	2,556	3,348	636	960	1,339	34.7	37.6	40.0	39.8	51.1	31.0	39.4
14-24 years	352	601	786	110	233	337	31.1	38.8	42.8	70.7	112.9	30.8	44.1
25-54 years	945	1,154	1,501	431	565	770	45.6	48.9	51.3	22.1	31.1	30.0	36.3
55 years and over	532	801	1,061	95	162	232	17.9	20.2	21.9	50.6	70.3	32.5	43.5
NONWHITE													
Male													
Total, 14 and over	276	361	493	210	276	367	76.2	76.4	74.4	31.0	31.3	36.4	32.9
14-24 years	74	115	167	43	70	95	58.1	61.2	56.8	56.0	64.2	45.4	35.1
24-54 years	153	182	248	139	169	230	91.0	92.7	92.9	19.4	21.7	36.1	36.2
55 years and over	49	64	78	28	37	41	57.5	57.0	53.3	29.6	28.5	21.1	13.1
Female													
Total, 14 and over	290	378	513	152	206	274	52.3	54.5	53.4	30.4	35.9	35.5	32.8
14-24 years	74	121	175	27	57	84	36.7	47.2	48.0	63.2	109.8	44.6	47.1
25-54 years	162	185	245	107	124	162	66.3	67.1	66.0	14.4	15.9	32.2	29.8
55 years and over	54	72	93	17	25	29	31.9	34.5	30.8	33.4	44.0	29.0	15.2

See footnotes at end of table.

TABLE 2. POPULATION AND LABOR FORCE (EXCLUDING ARMED FORCES OVERSEAS), BY AGE, COLOR,[1] AND SEX, FOR REGIONS AND STATES, 1960 AND PROJECTED 1970 AND 1980—Continued

[Numbers in thousands]

Age, color, and sex	Population (July 1)			Labor force (annual average)			Labor force participation rates (percent)			Percent change			
										1960-70		1970-80	
	1960 (April 1)	1970	1980	1960 (April 1)	1970	1980	1960	1970	1980	Population	Labor force	Population	Labor force
East South Central													
ALL CLASSES													
Both sexes, 14 and over	8,267	9,561	10,802	4,244	5,185	6,061	51.3	54.2	56.1	15.7	22.2	13.0	16.9
Male													
Total, 14 and over	3,988	4,607	5,220	2,908	3,318	3,771	72.9	72.0	72.2	15.5	14.1	13.3	13.7
14-24 years	1,012	1,369	1,478	525	751	813	51.8	54.8	55.0	35.3	43.1	7.9	8.2
25-54 years	2,041	2,173	2,584	1,883	2,039	2,427	92.2	93.8	93.9	6.5	8.3	18.9	19.0
55 years and over	935	1,064	1,158	500	528	531	53.5	49.6	45.9	13.8	5.5	8.8	.6
Female													
Total, 14 and over	4,279	4,955	5,582	1,336	1,867	2,290	31.2	37.7	41.0	15.8	39.7	12.7	22.7
14-24 years	998	1,347	1,443	258	464	531	25.9	34.5	36.8	34.9	79.9	7.2	14.4
25-54 years	2,209	2,303	2,646	879	1,117	1,413	39.8	48.5	53.4	4.3	27.1	14.9	26.5
55 years and over	1,072	1,305	1,492	199	285	346	18.6	21.9	23.2	21.8	43.5	14.3	21.2
NONWHITE													
Male													
Total, 14 and over	781	921	1,098	529	650	780	67.7	70.5	71.0	17.8	22.7	19.2	20.0
14-24 years	225	331	379	108	189	208	47.9	57.1	55.1	47.1	75.1	14.4	10.4
25-54 years	360	391	528	318	359	481	88.5	91.6	91.1	8.7	12.6	34.9	34.2
55 years and over	197	198	191	103	102	90	52.5	51.5	46.9	1.0	−1.0	−3.6	−12.2
Female													
Total, 14 and over	901	1,038	1,207	338	424	498	37.5	40.9	41.3	15.2	25.7	16.3	17.3
14-24 years	234	342	392	57	104	115	24.5	30.4	29.4	46.3	81.1	14.5	11.1
25-54 years	444	449	556	224	253	317	50.4	56.3	57.0	1.2	13.0	23.8	25.3
55 years and over	223	246	259	56	67	65	25.3	27.4	25.3	10.5	19.9	5.1	3.1
Kentucky													
ALL CLASSES													
Both sexes, 14 and over	2,111	2,357	2,595	1,034	1,218	1,413	49.0	51.7	54.4	11.6	17.8	10.1	16.0
Male													
Total, 14 and over	1,036	1,144	1,256	743	812	901	71.7	71.0	71.7	10.4	9.3	9.8	11.0
14-24 years	259	340	361	136	186	202	52.4	54.6	56.0	31.5	36.9	6.1	8.9
25-54 years	522	527	600	475	495	566	91.1	93.9	94.3	1.0	4.2	13.9	14.4
55 years and over	256	277	296	133	131	133	51.8	47.4	45.0	8.2	-.8	6.7	1.2
Female													
Total, 14 and over	1,074	1,212	1,339	291	406	512	27.1	33.5	38.2	12.8	39.4	10.4	26.0
14-24 years	242	321	339	56	102	126	23.1	31.8	37.2	32.5	82.0	5.7	23.9
25-54 years	545	556	623	186	236	302	34.0	42.5	48.5	1.9	27.2	12.1	27.9
55 years and over	287	336	377	50	68	84	17.3	20.3	22.2	17.1	37.1	12.1	22.7
NONWHITE													
Male													
Total, 14 and over	71	75	84	48	53	62	68.1	71.5	74.0	5.2	10.5	11.9	15.7
14-24 years	16	24	30	9	16	20	53.4	65.6	68.2	50.9	85.6	22.1	27.0
25-54 years	35	31	36	30	28	33	86.0	90.4	92.5	−10.1	5.5	14.4	17.1
55 years and over	20	19	18	10	9	8	49.2	48.4	46.9	−5.3	−6.8	−5.4	−8.3
Female													
Total, 14 and over	77	85	97	31	36	41	40.2	42.6	42.4	10.2	17.0	14.7	14.1
14-24 years	16	24	30	4	8	11	27.6	34.2	37.2	52.6	88.5	24.1	35.1
25-54 years	39	38	44	20	21	23	51.5	55.5	53.1	−3.8	3.6	15.4	10.5
55 years and over	22	23	24	6	7	7	28.8	30.5	29.6	5.1	11.3	4.0	.7

See footnotes at end of table.

TABLE 2. POPULATION AND LABOR FORCE (EXCLUDING ARMED FORCES OVERSEAS), BY AGE, COLOR,[1] AND SEX, FOR REGIONS AND STATES, 1960 AND PROJECTED 1970 AND 1980—Continued

[Numbers in thousands]

Age, color, and sex	Population (July 1)			Labor force (annual average)			Labor force participation rates (percent)			Percent change			
										1960-70		1970-80	
	1960 (April 1)	1970	1980	1960 (April 1)	1970	1980	1960	1970	1980	Population	Labor force	Population	Labor force
Tennessee													
ALL CLASSES													
Both sexes, 14 and over	2,499	2,929	3,287	1,314	1,617	1,860	52.6	55.2	56.6	17.2	23.1	12.2	15.0
Male													
Total, 14 and over	1,199	1,407	1,587	887	1,016	1,143	74.0	72.2	72.0	17.4	14.5	12.8	12.5
14-24 years	293	400	427	153	215	232	52.4	53.8	54.3	36.5	39.9	6.9	7.9
25-54 years	630	682	797	583	637	743	92.5	93.4	93.2	8.2	9.2	16.9	16.7
55 years and over	275	325	362	150	164	168	54.6	50.4	46.3	18.0	8.9	11.4	2.4
Female													
Total, 14 and over	1,300	1,522	1,700	427	601	717	32.8	39.5	42.2	17.0	41.0	11.7	19.3
14-24 years	295	399	422	82	147	160	27.8	36.8	38.0	35.5	79.3	5.6	9.1
25-54 years	685	720	809	283	362	442	41.3	50.3	54.6	5.1	27.8	12.4	22.0
55 years and over	321	402	469	61	92	115	19.2	23.0	24.6	25.4	50.3	16.4	24.7
NONWHITE													
Male													
Total, 14 and over	176	211	253	122	143	170	69.2	68.1	67.2	19.6	17.8	20.2	18.6
14-24 years	45	71	85	21	39	45	48.1	54.4	52.9	59.8	80.7	19.9	16.7
25-54 years	88	92	120	77	82	104	88.1	88.4	86.4	5.5	5.7	30.3	27.3
55 years and over	44	47	47	23	23	21	52.8	49.2	44.4	7.0	-.1	.7	-9.2
Female													
Total, 14 and over	202	240	283	82	103	119	40.8	42.8	42.1	18.7	24.6	18.0	15.9
14-24 years	47	75	90	12	23	29	25.3	31.2	32.0	58.4	95.2	19.8	22.8
25-54 years	106	107	130	57	62	72	53.6	57.8	55.8	1.0	9.0	21.7	17.7
55 years and over	49	58	63	14	18	18	28.3	30.5	28.1	18.1	27.4	8.9	.4
Alabama													
ALL CLASSES													
Both sexes, 14 and over	2,218	2,580	2,980	1,153	1,415	1,684	52.0	54.8	56.5	16.3	22.7	15.5	19.1
Male													
Total, 14 and over	1,060	1,239	1,440	779	898	1,042	73.6	72.5	72.4	16.9	15.2	16.3	16.1
14-24 years	270	365	400	139	200	214	51.4	54.7	53.3	35.3	43.9	9.6	6.9
25-54 years	556	598	731	516	561	686	92.8	93.8	93.8	7.6	8.6	22.3	22.4
55 years and over	234	275	309	125	138	143	53.3	50.0	46.2	17.8	10.4	12.1	3.6
Female													
Total, 14 and over	1,158	1,341	1,540	373	517	642	32.2	38.5	41.7	15.8	38.4	14.8	24.2
14-24 years	277	369	401	73	128	147	26.4	34.8	36.6	33.0	75.0	8.7	14.4
25-54 years	607	631	739	250	313	403	41.1	49.6	54.5	3.9	25.3	17.2	28.9
55 years and over	273	341	400	50	76	92	18.5	22.2	23.1	25.1	50.1	17.0	21.8
NONWHITE													
Male													
Total, 14 and over	280	333	400	188	231	276	67.2	69.5	68.9	19.1	23.2	20.2	19.3
14-24 years	83	120	135	40	65	65	47.5	54.0	48.4	43.2	63.0	12.9	1.2
25-54 years	130	145	197	115	132	179	88.0	90.9	90.7	11.4	15.0	35.9	35.5
55 years and over	66	69	69	34	35	32	50.9	51.0	46.7	4.0	4.1	-.1	-8.6
Female													
Total, 14 and over	329	375	434	124	155	180	37.5	41.3	41.4	13.9	25.5	15.8	16.1
14-24 years	88	124	139	22	38	40	25.0	30.6	28.6	40.8	72.3	12.0	4.6
25-54 years	163	164	202	83	94	118	50.7	57.2	58.3	.7	13.7	23.1	25.4
55 years and over	78	87	93	19	23	23	24.2	26.7	24.1	11.3	22.7	7.2	-3.1

See footnotes at end of table.

TABLE 2. POPULATION AND LABOR FORCE (EXCLUDING ARMED FORCES OVERSEAS), BY AGE, COLOR,[1] AND SEX, FOR REGIONS AND STATES, 1960 AND PROJECTED 1970 AND 1980—Continued

[Numbers in thousands]

Age, color, and sex	Population (July 1)			Labor force (annual average)			Labor force participation rates (percent)			Percent change			
										1960-70		1970-80	
	1960 (April 1)	1970	1980	1960 (April 1)	1970	1980	1960	1970	1980	Population	Labor force	Population	Labor force
	Mississippi												
ALL CLASSES													
Both sexes, 14 and over	1,439	1,696	1,939	743	935	1,104	51.6	55.1	56.9	17.8	25.9	14.4	18.0
Male													
Total, 14 and over	693	817	936	498	592	684	71.8	72.5	73.1	17.8	19.0	14.6	15.6
14-24 years	190	264	289	97	151	165	50.8	57.1	57.1	38.7	55.9	9.4	9.6
25-54 years	333	366	455	308	346	431	92.5	94.7	94.7	9.8	12.4	24.6	24.6
55 years and over	170	187	192	93	95	88	54.6	51.0	45.9	9.8	2.5	2.6	−7.5
Female													
Total, 14 and over	746	879	1,003	245	343	419	32.8	39.0	41.8	17.9	40.0	14.1	22.2
14-24 years	184	257	281	47	87	98	25.5	33.9	34.9	39.8	86.1	9.2	12.4
25-54 years	371	396	475	161	207	267	43.3	52.1	56.1	6.8	28.5	19.8	29.0
55 years and over	191	225	247	37	49	55	19.5	21.8	22.1	18.3	31.7	9.7	11.4
NONWHITE													
Male													
Total, 14 and over	255	302	361	171	221	272	67.3	73.2	75.3	18.7	29.1	19.4	22.8
14-24 years	81	116	129	38	70	78	47.3	60.1	60.4	43.4	82.2	11.0	11.7
25-54 years	107	123	175	97	117	166	90.0	95.2	94.7	14.3	20.8	42.5	41.8
55 years and over	66	64	57	36	35	28	54.8	54.5	49.3	−4.1	−4.6	−10.2	−18.8
Female													
Total, 14 and over	292	338	392	101	130	158	34.4	38.6	40.2	15.6	29.6	16.2	20.9
14-24 years	83	120	134	19	34	36	23.0	28.8	26.9	44.1	80.7	11.9	4.5
25-54 years	136	141	181	65	77	104	47.4	54.5	57.4	3.3	18.7	28.5	35.4
55 years and over	73	78	78	17	19	18	23.2	24.9	22.9	6.2	13.8	.4	−7.6
	West South Central												
ALL CLASSES													
Both sexes, 14 and over	11,645	13,917	16,180	6,192	7,714	9,267	53.2	55.4	57.3	19.5	24.6	16.3	20.1
Male													
Total, 14 and over	5,666	6,721	7,794	4,308	5,037	5,852	76.0	74.9	75.1	18.6	16.9	16.0	16.2
14-24 years	1,366	2,016	2,292	762	1,204	1,383	55.8	59.7	60.3	47.6	57.9	13.7	14.9
25-54 years	2,993	3,172	3,800	2,813	3,009	3,611	94.0	94.9	95.0	6.0	7.0	19.8	20.0
55 years and over	1,307	1,533	1,701	733	824	858	56.1	53.8	50.4	17.3	12.4	11.0	4.0
Female													
Total, 14 and over	5,979	7,196	8,386	1,884	2,677	3,415	31.5	37.2	40.7	20.3	42.1	16.5	27.6
14-24 years	1,346	1,957	2,217	356	654	826	26.5	33.4	37.2	45.4	83.6	13.3	26.2
25-54 years	3,150	3,375	3,986	1,230	1,572	2,022	39.1	46.6	50.7	7.2	27.8	18.1	28.6
55 years and over	1,484	1,863	2,183	297	451	568	20.0	24.2	26.0	35.6	51.7	17.2	26.1
NONWHITE													
Male													
Total, 14 and over	849	1,017	1,248	576	721	915	67.8	70.9	73.3	19.9	25.2	22.7	26.9
14-24 years	230	356	441	112	211	275	48.5	59.3	62.3	54.8	89.2	23.8	30.1
25-54 years	411	448	592	363	407	542	88.4	91.0	91.6	9.0	12.1	32.3	33.1
55 years and over	208	213	215	101	103	98	48.6	48.0	45.6	2.8	1.5	.8	−4.2
Female													
Total, 14 and over	953	1,138	1,379	363	481	599	38.1	42.3	43.4	19.5	32.5	21.2	24.5
14-24 years	238	365	450	59	114	148	24.6	31.3	32.8	53.6	95.1	23.3	29.2
25-54 years	487	514	645	252	298	378	51.7	58.1	58.6	5.5	18.5	25.5	26.6
55 years and over	228	259	284	53	69	73	23.2	26.5	25.9	13.8	29.6	9.5	7.1

See footnotes at end of table.

TABLE 2. POPULATION AND LABOR FORCE (EXCLUDING ARMED FORCES OVERSEAS), BY AGE, COLOR,[1] AND SEX, FOR REGIONS AND STATES, 1960 AND PROJECTED 1970 AND 1980—Continued

[Numbers in thousands]

Age, color, and sex	Population (July 1)			Labor force (annual average)			Labor force participation rates (percent)			Percent change			
										1960-70		1970-80	
	1960 (April 1)	1970	1980	1960 (April 1)	1970	1980	1960	1970	1980	Population	Labor force	Population	Labor force
						Arkansas							
ALL CLASSES													
Both sexes, 14 and over	1,249	1,459	1,616	610	769	894	48.8	52.7	55.4	16.8	26.1	10.8	16.3
Male													
Total, 14 and over	606	707	785	426	497	556	70.3	70.3	70.8	16.5	16.6	11.1	11.8
14-24 years	144	197	215	73	109	119	50.5	55.2	55.3	36.2	49.0	9.4	9.5
25-54 years	289	321	379	267	301	355	92.2	93.7	93.7	11.0	12.8	17.9	17.9
55 years and over	172	188	191	87	87	82	50.2	46.4	42.8	9.3	.9	1.2	−6.6
Female													
Total, 14 and over	643	752	831	183	272	339	28.5	36.1	40.8	17.0	48.2	10.5	24.6
14-24 years	141	195	211	33	65	78	23.6	33.3	37.1	38.3	95.1	8.5	20.9
25-54 years	318	336	381	118	162	209	37.2	48.1	54.8	5.7	36.5	13.2	29.0
55 years and over	184	221	239	32	45	52	17.2	20.4	21.6	20.2	42.6	8.2	14.4
NONWHITE													
Male													
Total, 14 and over	113	130	154	72	88	107	64.0	67.9	69.5	15.2	22.3	18.6	21.4
14-24 years	31	47	57	14	27	32	44.6	57.5	57.3	50.9	94.5	19.5	18.9
25-54 years	47	51	70	41	46	63	88.1	91.0	90.5	9.1	12.8	37.7	36.8
55 years and over	35	32	28	17	15	11	49.2	46.4	41.4	−8.9	−14.1	−13.2	−22.5
Female													
Total, 14 and over	128	145	168	39	52	65	30.8	35.6	38.6	13.9	31.7	15.3	25.1
14-24 years	31	48	57	6	12	15	19.4	25.9	27.2	52.6	104.0	19.1	24.9
25-54 years	60	59	73	26	31	41	42.9	52.0	56.4	−1.2	19.5	24.3	34.8
55 years and over	37	39	38	8	9	8	20.8	22.6	21.3	5.5	15.0	−2.9	−8.6
						Louisiana							
ALL CLASSES													
Both sexes, 14 and over	2,164	2,628	3,154	1,092	1,375	1,711	50.5	52.3	54.2	21.4	25.9	20.0	24.4
Male													
Total, 14 and over	1,037	1,268	1,527	756	907	1,104	72.9	71.5	72.3	22.3	19.9	20.4	21.8
14-24 years	256	385	451	126	208	253	49.4	54.0	56.0	50.6	64.7	17.0	21.4
25-54 years	557	613	767	516	568	712	92.6	92.7	92.8	10.0	10.2	25.1	25.3
55 years and over	224	270	310	114	131	140	51.0	48.5	45.3	20.4	14.5	14.6	7.0
Female													
Total, 14 and over	1,127	1,360	1,626	336	468	606	29.8	34.4	37.3	20.7	39.3	19.6	29.5
14-24 years	269	391	455	66	113	141	24.4	29.0	31.1	45.2	72.7	16.4	24.7
25-54 years	595	637	776	225	284	374	37.7	44.6	48.2	7.1	26.6	21.7	31.7
55 years and over	262	332	395	46	70	90	17.5	21.2	22.9	26.3	53.7	19.3	28.3
NONWHITE													
Male													
Total, 14 and over	299	367	459	195	246	319	65.3	66.9	69.5	23.1	26.2	24.8	29.7
14-24 years	87	131	159	40	72	91	45.8	54.7	57.1	51.8	81.4	21.3	26.6
25-54 years	142	164	225	125	143	197	88.1	87.3	87.8	15.0	13.9	37.5	38.3
55 years and over	70	73	75	30	31	30	43.0	43.1	40.8	4.1	4.2	2.8	−2.7
Female													
Total, 14 and over	343	412	502	123	162	204	35.8	39.4	40.7	20.1	32.3	21.8	25.9
14-24 years	92	138	166	21	37	42	23.3	26.5	25.2	50.9	71.5	20.4	14.6
25-54 years	171	183	236	85	104	139	49.7	56.8	58.8	7.0	22.3	28.6	33.0
55 years and over	80	91	100	16	21	24	20.1	23.7	23.8	12.9	33.2	10.3	10.9

See footnotes at end of table.

TABLE 2. POPULATION AND LABOR FORCE (EXCLUDING ARMED FORCES OVERSEAS), BY AGE, COLOR,[1] AND SEX, FOR REGIONS AND STATES, 1960 AND PROJECTED 1970 AND 1980—Continued

[Numbers in thousands]

Age, color, and sex	Population (July 1)			Labor force (annual average)			Labor force participation rates (percent)			Percent change			
										1960–70		1970–80	
	1960 (April 1)	1970	1980	1960 (April 1)	1970	1980	1960	1970	1980	Population	Labor force	Population	Labor force
	Oklahoma												
ALL CLASSES													
Both sexes, 14 and over	1,668	1,881	2,054	854	1,016	1,160	51.2	54.0	56.5	12.7	19.0	9.2	14.1
Male													
Total, 14 and over	812	908	991	596	663	732	73.5	73.1	73.8	11.8	11.2	9.1	10.3
14–24 years	190	256	273	104	153	168	54.8	59.7	61.6	35.3	47.3	6.6	10.1
25–54 years	406	418	476	379	393	450	93.2	94.0	94.4	2.9	3.8	13.9	14.4
55 years and over	216	233	241	114	117	113	52.8	50.2	47.0	8.0	2.8	3.4	−3.2
Female													
Total, 14 and over	856	973	1,063	258	353	428	30.1	36.3	40.3	13.6	37.1	9.3	21.2
14–24 years	179	242	257	47	86	107	26.3	35.7	41.8	35.2	83.6	6.3	24.1
25–54 years	431	442	490	162	198	242	37.6	45.0	49.3	2.5	22.5	11.0	21.5
55 years and over	246	289	316	48	68	79	19.6	23.5	25.1	17.3	40.8	9.2	16.8
NONWHITE													
Male													
Total, 14 and over	66	77	91	40	49	62	60.5	64.0	67.4	16.2	23.0	18.9	25.2
14–24 years	18	28	34	7	15	19	41.3	52.7	56.1	54.1	96.5	21.5	29.4
25–54 years	30	32	41	25	27	36	82.5	86.6	87.8	4.2	9.3	30.5	32.3
55 years and over	18	18	16	8	7	7	42.4	41.3	39.5	−1.4	−3.9	−5.9	−10.0
Female													
Total, 14 and over	74	87	103	23	31	39	31.6	36.0	37.4	17.6	34.1	18.7	23.4
14–24 years	18	27	34	4	9	13	20.9	32.1	37.3	54.0	136.7	23.6	43.4
25–54 years	37	38	46	16	17	21	42.5	46.0	44.8	3.4	11.9	22.9	19.7
55 years and over	19	22	23	4	5	5	20.8	23.5	22.6	11.3	25.6	5.3	1.6
	Texas												
ALL CLASSES													
Both sexes, 14 and over	6,563	7,949	9,357	3,636	4,553	5,503	55.4	57.3	58.8	21.1	25.2	17.7	20.8
Male													
Total, 14 and over	3,210	3,839	4,491	2,529	2,969	3,460	78.8	77.4	77.0	19.6	17.4	17.0	16.5
14–24 years	776	1,178	1,353	459	734	843	59.2	62.3	62.3	51.8	59.8	14.9	14.9
25–54 years	1,740	1,820	2,178	1,652	1,747	2,095	94.9	96.0	96.2	4.6	5.8	19.7	19.9
55 years and over	694	841	960	418	489	523	60.2	58.1	54.4	21.1	16.8	14.1	6.9
Female													
Total, 14 and over	3,353	4,111	4,866	1,107	1,584	2,043	33.0	38.5	42.0	22.6	43.1	18.4	29.0
14–24 years	757	1,130	1,295	210	399	499	27.8	34.5	38.5	49.3	85.1	14.6	28.0
25–54 years	1,805	1,960	2,339	725	927	1,197	40.2	47.3	51.2	8.6	27.9	19.4	29.1
55 years and over	791	1,021	1,232	171	267	347	21.7	26.2	28.2	29.1	55.9	20.7	29.8
NONWHITE													
Male													
Total, 14 and over	371	443	544	269	338	428	72.4	76.2	78.6	19.4	25.7	22.8	26.7
14–24 years	94	150	191	51	98	132	53.7	65.1	69.3	59.0	92.8	27.7	35.8
25–54 years	192	202	256	172	191	246	89.7	94.6	95.8	5.3	11.1	27.0	28.5
55 years and over	85	91	96	46	49	50	54.1	53.7	51.5	7.3	6.4	5.3	1.1
Female													
Total, 14 and over	408	494	606	178	236	291	43.6	47.8	48.1	21.0	32.5	22.7	23.4
14–24 years	97	152	193	27	57	78	28.2	37.2	40.2	56.3	106.0	27.2	37.4
25–54 years	219	234	289	125	146	177	57.2	62.5	61.2	6.5	16.5	23.8	21.2
55 years and over	91	108	123	25	33	36	27.5	30.7	29.5	18.4	32.3	14.1	9.6

See footnotes at end of table.

TABLE 2. POPULATION AND LABOR FORCE (EXCLUDING ARMED FORCES OVERSEAS), BY AGE, COLOR,[1] AND SEX, FOR REGIONS AND STATES, 1960 AND PROJECTED 1970 AND 1980—Continued

[Numbers in thousands]

Age, color, and sex	Population (July 1)			Labor force (annual average)			Labor force participation rates (percent)			Percent change			
										1960–70		1970–80	
	1960 (April 1)	1970	1980	1960 (April 1)	1970	1980	1960	1970	1980	Population	Labor force	Population	Labor force
	Mountain												
ALL CLASSES													
Both sexes, 14 and over	4,593	6,036	7,458	2,561	3,574	4,537	55.8	59.2	60.8	31.4	39.5	23.6	27.0
Male													
Total, 14 and over	2,295	2,981	3,664	1,800	2,349	2,904	78.4	78.8	79.3	29.9	30.5	22.9	23.6
14–24 years	551	899	1,085	333	595	736	60.4	66.2	67.8	63.0	78.7	20.8	23.7
25–54 years	1,247	1,457	1,823	1,185	1,403	1,760	95.0	96.3	96.6	16.9	18.4	25.1	25.5
55 years and over	497	625	756	283	351	408	56.8	56.2	53.9	25.7	24.3	20.9	16.1
Female													
Total, 14 and over	2,297	3,055	3,794	761	1,224	1,632	33.1	40.1	43.0	33.0	60.9	24.2	33.3
14–24 years	545	876	1,052	168	355	463	30.7	40.5	44.1	60.7	111.9	20.1	30.6
25–54 years	1,241	1,480	1,839	479	688	923	38.6	46.5	50.2	19.3	43.5	24.2	34.1
55 years and over	512	699	903	114	181	246	22.3	25.9	27.2	36.6	59.1	29.3	35.7
NONWHITE													
Male													
Total, 14 and over	104	138	192	67	94	134	64.6	68.4	69.9	33.1	41.0	39.3	42.4
14–24 years	32	50	77	14	27	42	45.0	53.8	55.1	57.3	87.8	54.6	58.5
25–54 years	54	67	90	44	57	79	81.8	85.5	88.2	24.8	30.5	33.9	38.1
55 years and over	18	21	25	9	10	13	47.5	48.1	49.6	15.7	17.2	20.5	24.1
Female													
Total, 14 and over	99	141	203	31	52	70	31.1	36.7	34.4	42.3	68.0	43.4	34.1
14–25 years	30	50	78	7	17	22	22.2	34.6	28.0	67.0	160.8	55.1	25.5
25–54 years	54	71	97	21	30	41	39.2	42.4	42.6	31.9	42.7	36.9	37.6
55 years and over	16	20	28	3	5	7	20.7	22.5	23.6	30.4	41.5	37.2	43.8
	Montana												
ALL CLASSES													
Both sexes, 14 and over	458	528	606	254	309	362	55.5	58.5	59.7	15.2	21.4	14.8	17.2
Male													
Total, 14 and over	234	266	303	181	205	234	77.5	77.2	77.4	13.9	13.4	14.0	14.2
14–24 years	52	76	86	30	49	57	59.0	64.2	66.4	47.0	60.1	12.7	16.6
25–54 years	122	126	148	117	121	141	95.6	95.9	95.6	3.0	3.3	17.5	17.2
55 years and over	60	64	70	34	36	36	56.6	55.9	52.2	7.5	6.1	8.4	1.2
Female													
Total, 14 and over	225	262	303	73	103	127	32.6	39.5	42.0	16.6	41.0	15.6	23.1
14–24 years	51	73	82	16	30	34	32.3	40.3	41.7	44.9	80.7	11.6	15.5
25–54 years	118	122	143	44	56	71	37.3	45.6	49.5	3.5	26.5	17.1	27.2
55 years and over	56	67	78	13	18	22	23.1	27.3	28.7	18.6	40.4	17.3	23.0
	Idaho												
ALL CLASSES													
Both sexes, 14 and over	447	522	613	251	319	388	56.1	61.2	63.2	16.6	27.1	17.4	21.4
Male													
Total, 14 and over	226	264	310	180	213	250	79.6	80.7	80.6	16.9	18.6	17.5	17.3
14–24 years	54	77	86	33	54	61	62.2	70.6	70.2	43.3	62.7	11.9	11.3
25–54 years	118	126	156	114	122	151	96.4	97.1	96.9	6.2	7.0	24.3	23.9
55 years and over	54	61	68	32	37	39	60.2	60.0	56.7	14.2	13.9	10.6	4.4
Female													
Total, 14 and over	222	258	303	71	106	137	32.2	41.1	45.4	16.3	48.6	17.4	29.7
14–24 years	53	73	82	16	30	35	29.8	40.2	43.0	38.0	86.5	12.4	20.2
25–54 years	116	120	143	44	59	78	38.0	48.8	54.7	3.6	32.9	19.0	33.4
55 years and over	52	64	77	11	18	24	21.8	27.8	30.8	22.6	56.4	20.3	32.9

See footnotes at end of table.

TABLE 2. POPULATION AND LABOR FORCE (EXCLUDING ARMED FORCES OVERSEAS), BY AGE, COLOR,[1] AND SEX, FOR REGIONS AND STATES, 1960 AND PROJECTED 1970 AND 1980—Continued

[Numbers in thousands]

Age, color, and sex	Population (July 1)			Labor force (annual average)			Labor force participation rates (percent)			Percent change			
										1960-70		1970-80	
	1960 (April 1)	1970	1980	1960 (April 1)	1970	1980	1960	1970	1980	Population	Labor force	Population	Labor force
	Wyoming												
ALL CLASSES													
Both sexes, 14 and over	224	262	307	130	159	189	58.0	60.7	61.6	16.9	22.4	17.4	19.1
Male													
Total, 14 and over	115	134	156	93	106	122	80.7	79.4	78.5	16.3	14.3	16.7	15.4
14-24 years	25	37	41	15	23	25	61.5	63.3	61.4	47.7	52.1	12.5	9.2
25-54 years	64	67	80	61	63	77	96.2	96.8	96.3	4.7	5.3	19.5	18.9
55 years and over	26	30	35	16	18	20	61.3	60.3	57.8	15.0	13.1	15.5	10.7
Female													
Total, 14 and over	109	128	151	37	53	67	34.0	41.3	44.3	17.5	42.6	18.1	26.6
14-24 years	25	36	40	8	14	17	31.3	40.5	42.4	42.9	85.1	13.4	18.9
25-54 years	60	62	73	23	30	39	38.8	48.3	53.6	3.0	28.2	18.6	31.9
55 years and over	24	31	38	6	8	11	25.1	28.3	28.0	27.2	43.3	22.4	21.2
	Colorado												
ALL CLASSES													
Both sexes, 14 and over	1,211	1,559	1,874	681	933	1,162	56.2	59.9	62.0	28.7	37.1	20.2	24.5
Male													
Total, 14 and over	595	755	904	468	603	736	78.7	79.9	81.4	27.1	29.0	19.6	21.9
14-24 years	137	230	268	85	156	191	62.4	68.0	71.2	67.9	82.9	16.8	22.4
25-54 years	321	367	448	306	356	437	95.4	97.1	97.5	14.2	16.3	22.1	22.6
55 years and over	137	159	188	76	91	108	55.7	57.2	57.5	16.5	19.7	17.9	18.5
Female													
Total, 14 and over	617	803	970	213	330	427	34.5	41.1	44.0	30.2	54.9	20.8	29.3
14-24 years	134	222	257	45	95	120	33.6	42.7	46.8	65.8	110.6	15.7	27.1
25-54 years	329	388	473	134	186	242	40.8	47.9	51.2	17.9	38.6	22.1	30.4
55 years and over	154	194	240	34	50	64	22.0	25.6	26.6	25.5	45.8	24.0	29.1
	New Mexico												
ALL CLASSES													
Both sexes, 14 and over	607	761	997	328	433	588	54.0	56.9	58.9	25.4	32.1	31.1	35.6
Male													
Total, 14 and over	305	377	489	236	287	378	77.5	76.2	77.2	23.5	21.5	29.7	31.4
14-24 years	83	128	161	48	78	101	57.6	61.2	62.8	54.9	64.3	25.9	29.2
25-54 years	170	181	241	159	172	232	93.7	95.0	96.1	6.6	8.1	33.2	34.8
55 years and over	52	68	86	30	37	44	56.5	54.6	51.6	28.7	24.3	27.7	20.6
Female													
Total, 14 and over	302	384	508	92	146	210	30.3	38.0	41.3	27.3	59.5	32.4	43.9
14-24 years	80	120	153	21	46	63	26.7	38.6	41.2	50.3	117.5	27.9	36.6
25-54 years	169	189	251	59	81	119	34.9	42.9	47.6	11.8	37.2	32.9	47.3
55 years and over	53	75	104	11	19	28	21.1	24.8	26.4	41.9	66.8	38.3	47.1
	Arizona												
ALL CLASSES													
Both sexes, 14 and over	871	1,315	1,734	471	740	1,009	54.1	56.3	58.2	50.9	57.2	31.9	36.3
Male													
Total, 14 and over	435	645	846	331	494	654	76.0	76.5	77.3	48.4	49.3	31.1	32.6
14-24 years	107	190	249	63	122	168	59.0	64.3	67.3	78.0	93.8	31.2	37.3
25-54 years	239	320	417	224	306	403	93.5	95.6	96.5	33.8	36.8	30.5	31.8
55 years and over	89	136	180	44	66	84	49.3	48.4	46.6	51.8	49.0	32.4	27.5
Female													
Total, 14 and over	436	669	888	140	247	354	32.2	36.9	39.9	53.5	75.8	32.6	43.7
14-24 years	103	187	244	28	68	102	27.5	36.1	41.7	81.2	137.6	30.1	50.5
25-54 years	241	329	427	93	146	201	38.5	44.3	47.1	36.2	56.9	30.0	38.2
55 years and over	91	153	217	19	33	51	20.8	21.8	23.7	67.7	75.7	41.3	53.6

See footnotes at end of table.

TABLE 2. POPULATION AND LABOR FORCE (EXCLUDING ARMED FORCES OVERSEAS), BY AGE, COLOR,[1] AND SEX, FOR REGIONS AND STATES, 1960 AND PROJECTED 1970 AND 1980—Continued

[Numbers in thousands]

Age, color, and sex	Population (July 1)			Labor force (annual average)			Labor force participation rates (percent)			Percent change			
										1960-70		1970-80	
	1960 (April 1)	1970	1980	1960 (April 1)	1970	1980	1960	1970	1980	Population	Labor force	Population	Labor force
						Utah							
ALL CLASSES													
Both sexes, 14 and over	572	756	946	319	461	596	55.7	61.0	63.0	32.2	44.8	25.1	29.2
Male													
Total, 14 and over	281	373	467	224	302	378	79.8	81.0	80.8	32.4	34.5	25.4	25.1
14-24 years	74	117	140	44	80	95	59.4	68.4	68.3	59.0	82.9	19.6	19.4
25-54 years	152	185	242	145	179	232	95.7	96.2	95.7	22.5	23.2	30.4	29.8
55 years and over	56	70	85	36	43	50	63.2	61.8	59.1	24.0	21.3	21.7	16.3
Female													
Total, 14 and over	290	383	479	94	150	219	32.4	41.6	45.7	32.1	69.4	24.9	37.1
14-24 years	79	121	144	26	53	68	33.0	43.8	47.4	54.1	104.6	18.8	28.6
25-54 years	150	182	234	54	82	118	36.2	45.3	50.3	21.4	52.1	28.6	42.7
55 years and over	61	80	101	14	24	33	22.7	29.9	32.5	30.2	71.4	25.7	36.5
						Nevada							
ALL CLASSES													
Both sexes, 14 and over	202	334	381	127	218	243	63.0	65.4	63.8	65.5	71.6	13.9	11.2
Male													
Total, 14 and over	105	167	189	87	139	152	83.1	83.0	80.6	59.1	58.9	12.9	9.7
14-24 years	21	45	54	14	32	38	66.7	72.8	71.2	107.5	126.4	20.9	18.2
25-54 years	61	86	90	58	83	88	95.7	96.8	97.0	40.6	42.4	5.4	5.6
55 years and over	23	37	45	15	23	26	64.7	63.2	58.9	62.8	59.0	20.7	12.3
Female													
Total, 14 and over	97	167	192	40	80	91	41.3	47.7	47.3	72.4	99.2	14.9	14.0
14-24 years	21	43	50	7	20	23	33.8	45.8	47.1	110.6	186.0	14.4	17.6
25-54 years	58	89	94	28	49	54	48.3	55.2	57.4	53.8	76.0	5.5	9.7
55 years and over	19	35	48	5	11	14	27.9	30.8	28.0	87.8	107.3	39.4	26.7
						Pacific							
ALL CLASSES													
Both sexes, 14 and over	15,017	19,490	24,182	8,611	11,565	14,495	57.3	59.3	59.9	29.8	34.3	24.1	25.3
Male													
Total, 14 and over	7,466	9,510	11,688	5,907	7,616	9,401	79.1	80.1	80.4	27.4	28.9	22.9	23.4
14-24 years	1,633	2,718	3,287	1,019	1,895	2,319	62.5	69.7	70.6	66.5	85.8	20.9	22.4
25-54 years	4,142	4,680	5,818	3,941	4,525	5,630	95.1	96.7	96.8	13.0	14.8	24.3	24.4
55 years and over	1,692	2,113	2,583	947	1,196	1,452	56.0	56.6	56.2	24.9	26.4	22.3	21.4
Female													
Total, 14 and over	7,551	9,980	12,493	2,703	3,949	5,094	35.8	39.6	40.8	32.2	46.1	25.2	29.0
14-24 years	1,529	2,582	3,137	488	1,043	1,415	32.0	40.4	45.1	68.9	113.5	21.5	35.7
25-54 years	4,116	4,888	6,123	1,777	2,284	2,873	43.2	46.7	46.9	18.8	28.5	25.3	25.8
55 years and over	1,901	2,510	3,234	438	622	805	23.0	24.8	24.9	31.7	42.1	28.8	29.4
NONWHITE													
Male													
Total, 14 and over	641	830	1,086	495	652	852	77.1	78.5	78.5	29.5	31.7	30.7	30.8
14-24 years	148	262	368	81	166	238	54.4	63.4	64.7	76.5	105.8	40.5	43.5
25-54 years	381	415	525	346	393	502	91.0	94.7	95.7	9.0	13.5	26.5	27.8
55 years and over	112	153	193	68	93	112	60.3	60.5	58.1	36.6	36.9	25.6	20.7
Female													
Total, 14 and over	598	850	1,173	258	401	543	43.1	47.1	46.3	42.2	55.4	38.0	35.6
14-24 years	143	258	370	44	103	168	30.4	40.1	45.3	80.0	136.8	43.2	62.1
25-54 years	362	457	597	187	251	302	51.8	55.0	50.5	26.3	34.1	30.7	20.0
55 years and over	92	135	206	27	46	74	28.8	33.9	35.7	46.0	72.1	52.8	61.0

See footnotes at end of table.

TABLE 2. POPULATION AND LABOR FORCE (EXCLUDING ARMED FORCES OVERSEAS), BY AGE, COLOR,[1] AND SEX, FOR REGIONS AND STATES, 1960 AND PROJECTED 1970 AND 1980—Continued

[Numbers in thousands]

Age, color, and sex	Population (July 1)			Labor force (annual average)			Labor force participation rates (percent)			Percent change			
										1960-70		1970-80	
	1960 (April 1)	1970	1980	1960 (April 1)	1970	1980	1960	1970	1980	Population	Labor force	Population	Labor force
	Washington												
ALL CLASSES													
Both sexes, 14 and over	2,006	2,329	2,713	1,125	1,368	1,628	56.1	58.7	60.0	16.1	21.6	16.5	19.0
MALE													
Total, 14 and over	1,003	1,145	1,322	780	893	1,041	77.8	78.0	78.8	14.2	14.4	15.4	16.6
14-24 years	219	337	372	135	230	261	61.7	68.4	70.3	54.0	70.8	10.6	13.6
25-54 years	533	529	637	508	511	617	95.4	96.6	96.9	−.7	.6	20.5	20.8
55 years and over	252	280	312	137	152	162	54.5	54.2	51.8	11.0	10.2	11.5	6.8
FEMALE													
Total, 14 and over	1,002	1,184	1,391	344	475	587	34.4	40.1	42.2	18.1	37.8	17.6	23.6
14-24 years	210	315	349	67	130	158	32.2	41.2	45.4	50.3	92.4	10.7	21.9
25-54 years	528	548	659	216	259	322	40.9	47.3	48.8	3.7	19.9	20.2	24.2
55 years and over	264	320	384	61	86	107	23.1	26.8	27.9	21.3	41.1	19.7	24.5
	Oregon												
ALL CLASSES													
Both sexes, 14 and over	1,251	1,473	1,672	685	827	948	54.7	56.1	56.7	17.7	20.7	13.5	14.7
MALE													
Total, 14 and over	617	722	822	469	539	615	76.0	74.6	74.9	17.1	14.9	13.8	14.2
14-24 years	125	191	204	67	111	121	53.9	58.2	59.5	52.9	64.9	6.6	9.1
25-54 years	325	343	412	309	328	393	95.0	95.6	95.3	5.4	6.1	20.4	20.0
55 years and over	166	188	205	92	100	101	55.6	53.1	49.1	13.1	8.0	9.2	1.0
FEMALE													
Total, 14 and over	[illegible]	751	850	216	288	333	34.1	38.3	39.1	18.3	33.1	13.2	15.5
14-24 years	130	196	206	40	77	89	31.1	39.2	43.3	50.5	89.5	5.1	16.2
25-54 years	329	341	396	134	156	183	40.7	45.7	46.2	3.6	16.1	16.0	17.5
55 years and over	175	214	249	41	56	61	23.8	26.0	24.4	22.2	33.1	16.0	9.0
	California												
ALL CLASSES													
Both sexes, 14 and over	11,185	14,980	18,962	6,436	8,926	11,412	57.5	59.6	60.2	33.9	38.7	26.6	27.8
Male													
Total, 14 and over	5,526	7,261	9,114	4,395	5,881	7,413	79.5	81.0	81.4	31.4	33.8	25.5	26.0
14-24 years	1,194	2,043	2,543	751	1,450	1,824	63.0	71.0	71.7	71.2	93.0	24.6	25.8
25-54 years	3,105	3,635	4,576	2,953	3,522	4,438	95.1	96.9	97.0	17.1	19.3	25.9	26.0
55 years and over	1,227	1,582	1,993	690	909	1,151	56.2	57.4	57.8	28.9	31.8	26.0	26.7
Female													
Total, 14 and over	5,659	7,719	9,848	2,041	3,045	3,999	36.1	39.4	40.6	36.4	49.2	27.6	31.3
14-24 years	1,123	1,973	2,464	360	799	1,120	32.1	40.5	45.5	75.7	121.9	24.9	40.1
25-54 years	3,105	3,821	4,857	1,355	1,780	2,265	43.6	46.6	46.6	23.1	31.4	27.1	27.3
55 years and over	1,432	1,926	2,527	326	466	614	22.8	24.2	24.3	34.5	42.9	31.2	31.7
NONWHITE													
Male													
Total, 14 and over	428	583	795	335	468	642	78.2	80.4	80.8	36.1	39.9	36.5	37.2
14-24 years	95	180	270	54	118	181	56.6	65.3	67.2	89.0	118.0	49.3	53.9
25-54 years	260	300	392	236	286	380	90.5	95.5	96.9	15.0	21.4	30.7	32.7
55 years and over	72	103	134	45	64	82	62.4	62.8	60.8	42.2	43.2	30.8	26.7
Female													
Total, 14 and over	408	616	882	180	293	410	44.1	47.6	46.5	50.9	62.7	43.0	39.9
14-24 years	93	184	276	29	76	131	31.2	41.4	47.4	96.4	160.8	50.5	72.3
25-54 years	252	335	454	131	182	225	52.1	54.4	49.5	32.9	38.7	35.5	23.3
55 years and over	63	98	151	20	35	55	31.3	35.9	36.2	55.4	78.5	54.9	56.1

See footnotes at end of table.

Table 2. Population and Labor Force (Excluding Armed Forces Overseas), by Age, Color,[1] and Sex, for Regions and States, 1960 and Projected 1970 and 1980—Continued

[Numbers in thousands]

Age, color, and sex	Population (July 1)			Labor force (annual average)			Labor force participation rates (percent)			Percent change			
										1960-70		1970-80	
	1960 (April 1)	1970	1980	1960 (April 1)	1970	1980	1960	1970	1980	Population	Labor force	Population	Labor force
	Alaska												
All Classes													
Both sexes, 14 and over	149	179	223	99	114	135	66.9	63.6	60.3	20.2	14.3	24.8	18.5
Male													
Total, 14 and over	89	100	117	76	82	93	85.3	81.6	79.5	12.7	7.8	17.3	14.2
14-24 years	28	41	50	22	30	35	78.2	73.0	70.2	45.4	35.8	21.1	16.5
25-54 years	52	46	52	48	43	49	93.0	94.1	94.8	−11.1	−9.9	12.7	13.5
55 years and over	9	13	15	5	8	9	63.0	64.6	58.0	45.6	49.4	21.3	8.8
Female													
Total, 14 and over	60	79	106	24	32	42	39.6	40.7	39.2	31.4	34.9	34.4	29.4
14-24 years	15	25	34	5	10	13	34.1	39.1	39.9	60.7	84.4	36.4	39.0
25-54 years	39	45	58	17	19	24	42.7	43.3	41.8	16.1	17.8	29.3	25.0
55 years and over	6	9	14	2	3	4	34.1	32.2	26.7	55.8	47.2	54.1	27.7
	Hawaii												
All Classes													
Both sexes, 14 and over	426	529	612	266	331	372	62.3	62.5	60.8	24.0	24.4	15.7	12.6
Male													
Total, 14 and over	232	282	314	188	222	239	81.2	78.6	76.1	21.7	17.8	11.3	7.7
14-24 years	67	105	115	44	73	77	65.4	69.0	66.6	57.7	66.5	9.5	5.7
25-54 years	128	127	141	123	121	132	96.1	95.3	93.8	−.7	−1.5	11.2	9.5
55 years and over	37	50	57	21	28	29	58.1	56.2	51.3	34.0	29.6	15.4	5.2
Female													
Total, 14 and over	195	247	298	78	109	134	39.9	44.1	44.8	26.8	40.3	20.7	22.6
14-24 years	51	74	84	15	27	34	29.6	37.1	40.7	45.1	81.8	14.1	25.4
25-54 years	114	132	154	56	70	79	48.6	52.9	51.7	15.9	26.0	15.9	13.3
55 years and over	30	41	61	7	12	20	23.7	28.3	32.8	37.7	64.6	48.4	72.0
Nonwhite													
Male													
Total, 14 and over	150	171	192	115	129	139	77.1	75.2	72.7	14.5	11.5	12.1	8.
14-24 years	36	53	58	18	31	33	49.1	59.1	56.8	47.6	77.7	10.3	6.0
25-54 years	85	81	91	81	76	84	95.5	94.3	92.4	−4.3	−5.6	12.3	10.1
55 years and over	29	37	42	17	21	22	58.3	56.6	52.4	28.3	24.6	14.0	5.6
Female													
Total, 14 and over	135	159	186	59	78	92	43.6	49.2	49.3	17.6	32.6	17.2	17.6
14-24 years	35	49	55	11	19	23	30.5	38.8	42.0	37.8	75.5	13.2	22.7
25-54 years	78	83	91	43	51	54	55.1	61.3	59.6	6.3	19.3	10.0	6.2
55 years and over	21	27	39	5	8	14	23.2	28.8	35.6	25.1	55.1	46.6	81.4

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[1] Data by color are shown only for those States where the nonwhite population 14 years of age and over was 100,000 or more in 1960.

NOTE: Population projections of States are consistent with national population projections published in *Current Population Reports*, Series P-25, No. 286, "Projections of the Population of the United States, by Age and Sex: 1964 to 1985." Projected labor force data are consistent with data in "Labor Force Projections for 1970-80," *Monthly Labor Review*, February 1965, pp. 129-140 (reprinted as Special Labor Force Report No. 49) and "Labor Force Projections by Color, 1970-80," *Monthly Labor Review*, September 1966, pp. 965-972 (reprinted as Special Labor Force Report No. 73), but exclude Armed Forces overseas. State labor force data from the decennial census relate to April 1960 and are therefore not comparable with projections of the U.S. labor force which are based on annual average levels from the monthly labor force (household) survey.

Because of rounding, sums of individual items may not equal totals. Rates and percent changes are based on unrounded numbers.

SOURCE: Population and labor force data for 1960 are from the decennial census. Projections of the population for 1970 and 1980 are from "Illustrative Projections of the Population of States: 1970 to 1980," *Current Population Reports*, Series P-25, No. 326.

TABLE 3. PERCENT INCREASE IN PROJECTED LABOR FORCE OF STATES, 1960–70 AND 1970–80, IN RANK ORDER

Rank order	1960-70		1970-80	
	State	Percent increase	State	Percent increase
1	Nevada	71.6	Arizona	36.3
2	Arizona	57.2	New Mexico	35.6
3	Utah	44.8	Florida	33.5
4	Florida	41.6	Utah	29.2
5	California	38.7	California	27.8
6	Colorado	37.1	Colorado	24.5
7	New Mexico	32.1	Louisiana	24.4
8	Maryland	28.5	Delaware	22.7
9	Idaho	27.1	Idaho	21.4
10	Georgia	26.9	Texas	20.8
11	Arkansas	26.1	Maryland	20.4
12	Delaware	26.0	Minnesota	19.2
13	Mississippi	25.9	Indiana	19.1
14	Louisiana	25.9	Wyoming	19.1
15	Virginia	25.8	Alabama	19.1
16	Texas	25.2	Washington	19.0
17	Hawaii	24.4	Wisconsin	18.8
18	South Carolina	23.7	New Hampshire	18.5
19	Tennessee	23.1	Alaska	18.5
20	Connecticut	22.7	Ohio	18.2
21	Alabama	22.7	Virginia	18.1
22	Wyoming	22.4	Mississippi	18.0
23	New Hampshire	22.3	Michigan	18.0
24	North Carolina	22.2	District of Columbia	17.4
25	New Jersey	22.0	Montana	17.2
26	Washington	21.6	Vermont	17.0
27	Montana	21.4	New Jersey	16.8
28	Oregon	20.7	Connecticut	16.8
29	Vermont	20.5	Illinois	16.3
30	Ohio	19.8	Arkansas	16.3
31	Indiana	19.6	Kentucky	16.0
32	Oklahoma	19.0	Georgia	15.8
33	Wisconsin	18.9	Tennessee	15.0
34	South Dakota	18.8	Oregon	14.7
35	Minnesota	18.4	South Carolina	14.6
36	Michigan	18.1	Oklahoma	14.1
37	Kentucky	17.8	North Carolina	14.0
38	Nebraska	17.2	Kansas	14.0
39	North Dakota	16.6	Iowa	13.8
40	New York	16.1	North Dakota	13.7
41	Kansas	15.6	Massachusetts	13.5
42	Massachusetts	14.3	Maine	13.4
43	Alaska	14.3	Missouri	13.4
44	Illinois	14.2	South Dakota	13.[illegible]
45	West Virginia	14.1	Nebraska	12.6
46	Iowa	12.7	Hawaii	12.6
47	Maine	11.5	Nevada	11.2
48	Pennsylvania	11.2	Pennsylvania	10.9
49	Rhode Island	10.2	New York	10.4
50	Missouri	9.8	West Virginia	8.9
51	District of Columbia	9.4	Rhode Island	7.4
	United States, total	22.0	United States, total	18.1

years immediately after World War II. Many of these individuals have entered the labor force as young workers or will enter it prior to 1970.

In the four regions, the rise in the number of workers in each of the broad age groups will be similar to national trends. For example, the projected 1960-70 increase in the number of workers 14 to 24 years old varies from 56 percent in the Northeast to 94 percent in the West. The rise in the number of workers in the other two age groups, 25 to 54 and 55 and over, will remain considerably below the increase in the number of younger workers. This fact is especially true of the central age group, 25 to 54, which will experience a gain of 21 percent in the West and only 6 percent in the Northeast and North Central regions. Older workers, 55 and over, will show a gain approximately 10 to 12 percentage points higher than that of the immediately preceding age group.

The 1970's

Between 1970 and 1980, the total resident labor force is expected to rise from 85.3 million to 100.7 million workers, an increase of 18 percent. On a geographical basis, the same broad pattern of growth is still evident. The West once again will show the greatest rise, 26 percent, however, this increase is 10 percentage points less than during the preceding 10 years. The South also will experience a smaller gain than previously—19 percent, compared with 25 percent for the 1960-70 period. The Northeast region also is expected to rise somewhat less than in 1960-70; only the North Central region will increase by about the same percentage as in the previous decade, about 17 percent.

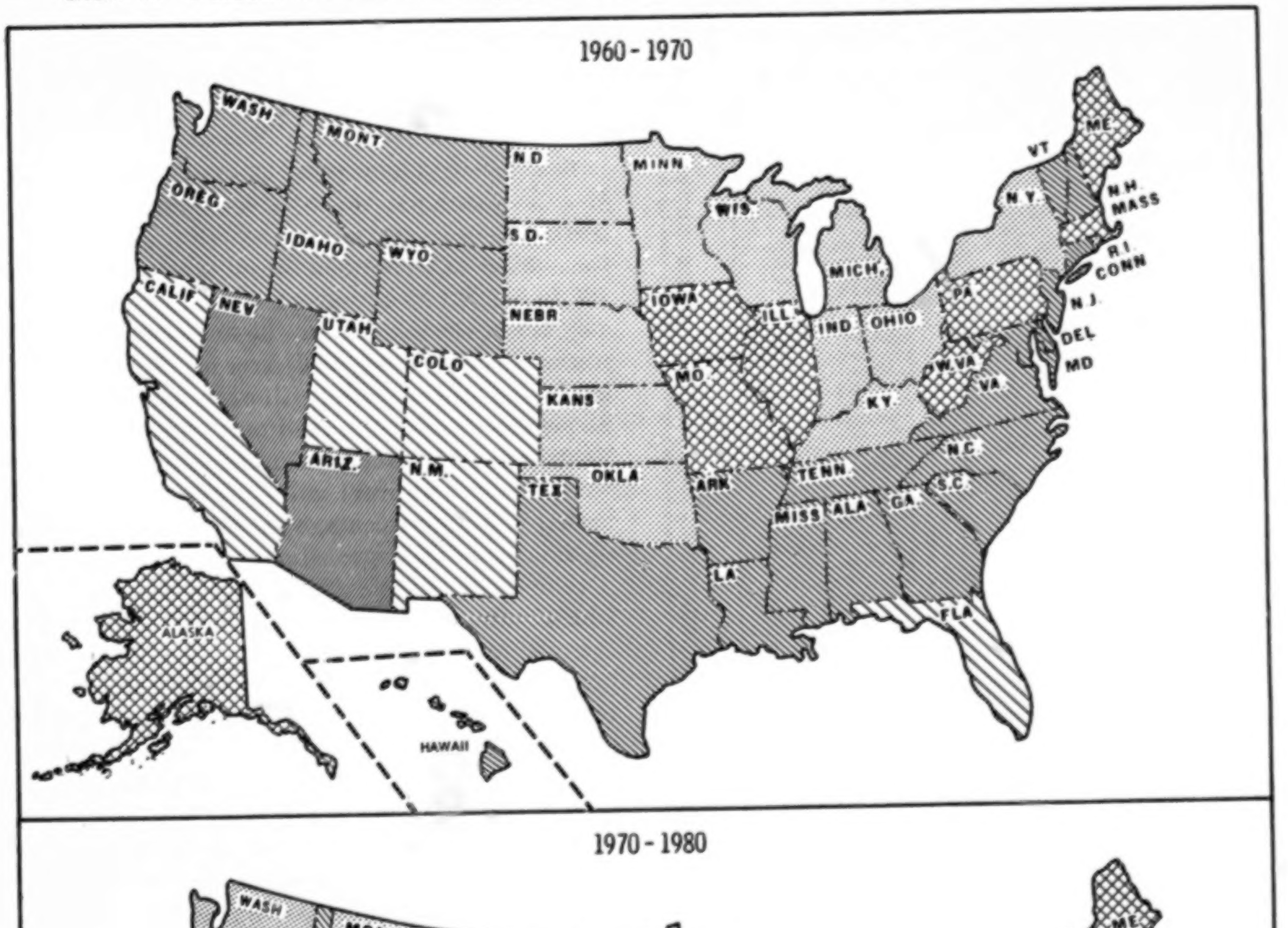
Smaller increases in the 1970-80 decade also are evident when we look at the individual States. For example, for the 1970-80 period only three States may gain more than 30 percent: Arizona, New Mexico, and Florida, about 35 percent. Only eight will gain from 20 to 29 percent. The remaining States are expected to show gains ranging from 7 percent to 19 percent.

The labor force growth patterns for the broad age groups expected during the 1970-80 period are expected to differ substantially from those described for the 1960-70 period. The most striking difference will occur among younger workers. For the Nation, the number of workers 14 to 24 will rise only about one-third as fast between 1970 and 1980 as it did in the 1960-70 period. Conversely, the group of workers age 25 to 54, which shows small gains for the 1960-70 period, is expected to increase by 19 percent during the 1970-80 period. In other words, the large number of births in the late 1940's and early 1950's produces the expectation of a large number of workers in the 14 to 24 age group during the 1960-70 decade, but by the 1970's these same workers will be advancing into the 25 to 54 group.

The effect will be felt also in the regions. For example, in the West, the number of workers age 14 to 24 is expected to rise by 27 percent, workers 25 to 54 by 26 percent, and workers 55 years old and over by 24 percent. Similar changes will occur in the other regions, where the projected increases in the three broad age groups are not expected to vary more than 7 percentage points.

The nonwhite labor force will increase by 31 and 26 percent in the two successive decades, compared with 22 and 18 percent for the labor force as a whole. In the

Chart 1. Percent Increase in Projected Labor Force of States, 1960–70 and 1970–80


1960 - 1970
WASH
MONT
N.D.
MINN.
OREG.
IDAHO
WYO
S.D.
WIS
MICH
CALIF
NEV
UTAH
COLO
NEBR
IOWA
ILL
IND
OHIO
KANS
MO
KY
ARIZ
N.M.
TEX
OKLA
ARK
TENN
MISS
ALA
GA
LA
FLA
N.C.
S.C.
VA
W.VA
PA
N.Y.
VT
ME.
N.H.
MASS
R.I.
CONN
N.J.
DEL
MD
ALASKA
HAWAII
1970 - 1980
PERCENT CHANGE
10 - 14.9
15 - 19.9
20 - 29.9
30 - 49.9
50 AND OVER

South and West, the nonwhite labor force will increase only slightly faster than the total for the region. In the Northeast and North Central regions, the nonwhite labor force will grow at about twice the rate for the whole labor force. These data have significant implications for education and employment policies in all of these regions.

Reliability

Before describing the methods used in making these projections some discussion of the limitations affecting the reliability of these projections is necessary. First, the most important element in the size of the projected labor force of each State is the projection of the population of working age. In projecting the population for the next 10 or 15 years, the most critical variable is the magnitude and composition of net interstate migration. Our selection of the Series II migration assumption cannot be supported by specific evidence; it reflects our judgment that interstate migration is essentially purposive movement which occurs to a considerable degree in response to differential economic opportunities. Limited evidence exists that these differentials tend to decline over time, partly as a result of the population movements they originally inspire.[6] We therefore selected the series which assumes a very gradual decline in the net interstate migration in preference to the series which assumed a constant rate equal to that observed during 1955-60. Alternative assumptions in regard to the volume and direction of interstate migration in the future would result in a considerably different set of population projections, and, therefore, would yield different labor force projections as well. For example, the number of workers in the State of California, where net immigration is substantial, would be 135,000 (1.0 percent) greater than our projection of 13.4 million if the "high migration" assumption had been employed. Conversely, assuming no net migration would yield a labor force 302,000 (2.2 percent) less. In comparison, the high migration assumption for the State of Maine would produce a 1970 labor force only 5,000 (0.7 percent) less than our projection of 669,000, and the assumption of no net migration would yield a labor force 11,000 (1.6 percent) greater. For most of the States, the effect of the alternative migration assumptions would fall within the range indicated in the above examples.

Second, in projecting the labor force participation rates (percent of population in the labor force for specific age groups of men and women), the procedure that was applied to past labor force participation rates was the same for each State. The chief merits of this approach are its simplicity and objectivity. The chief limitation is its failure to take explicit account of past economic or social circumstances of a State which are not expected to continue, or possible special future circumstances which could affect the labor force participation rates for some States. For this reason, these projections should be regarded only as a very approximate indication of future developments. They should not be regarded as a substitute for more detailed projections which might be prepared for any particular State on the basis of a careful analysis of its peculiar circumstances and developmental policies.[7]

In view of these limitations, we would appreciate comments or suggestions from users of these data in regard to their usefulness and improvements. We also would welcome any examples of projections that may have been developed by users for local areas, together with information as to techniques employed in their development.

The procedure used in projecting the labor force has four essential steps. First, for each age-sex-color group, the labor force participation rate for 1940, 1950, and 1960 for each State was expressed as a ratio of the corresponding national labor force participation rate. Next, these ratios were extrapolated to 1970 and 1980 by extending the trend shown by the three past observations. Then the extrapolated ratios were applied to independently projected national labor force participation rates for 1970 and 1980. Finally, the projected labor force participation rates were applied to the projected population for each age-sex-color cell for the States. The effect of this procedure is to take specific account of differences among States in the rates for each age-sex-color group, and the trend in these differences over the 1940-60 period, in projecting the relationship of the rates for each State to the national average.

Method

As was stated earlier, the State labor force projections were prepared by a procedure consisting of four basic steps. First approximations and successive adjustments were obtained by using a special program written in FORTRAN language for the IBM 7074 computer. The basic inputs were: (1) State labor force participation rates, by age, sex, and color, for 1940, 1950, and 1960;[8] (2) national labor force participation rates, by age, sex, and color, for 1940, 1950, and 1960, and projections to 1970 and 1980; and (3) projected State resident population, by age, sex, and color, for 1970 and 1980.

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[6] Lowell D. Ashby, "The Geographical Redistribution of Employment: An Examination of the Elements of Change," *Survey of Current Business*, October 1944, pp. 13-20.

[7] According to the results of a recent mail survey by the Census Bureau, at least 30 State agencies carry out population projections for their own use. In addition, in nearly every State, one or more universities or private organizations engage in population projections as a part of their research or planning activities. See the Bureau of the Census, "Inventory of State and Local Agencies Preparing Population Estimates–Survey of 1965," *Current Population Reports*, Series P-25, No. 328.

Steps 1 and 2 of the procedure involved computing ratios of State labor force participation rates for each age-sex-color group to corresponding national labor force participation rates, and extrapolating trends for these ratios to 1970 and 1980. Using the basic data described above we have:

$$(1) \quad T_{40-50} = (SR_{50}/NR_{50}) - (SR_{40}/NR_{40})$$

$$(2) \quad T_{50-60} = (SR_{60}/NR_{60}) - (SR_{50}/NR_{50})$$

where

T_i=trend.

SR_i=State labor force participation rate for a given age-sex-color group.

NR_i=National labor force participation rate for a given age-sex-color group.

i=Time, expressed as a 10-year time interval, e.g., 1940-50, 1950-60.

Using the trends computed in (1) and (2), and assigning weights of two-thirds to the most recent decade and one-third to the other period, the following relationships were established:

$$(3) \quad T_{60-70} = 1/3[(T_{40-50}) + 2(T_{50-60})]$$

$$(4) \quad T_{70-80} = 1/3[(T_{50-60}) + 2(T_{60-70})]$$

Projected State labor force participation rates, by age, sex, and color for 1970 and 1980 were then obtained by solving for SR_{70} and SR_{80} in equations (3) and (4) respectively:

$$(5) \quad SR_{70} = [NR_{70}]\,[(T_{60-70}) + (SR_{60}/NR_{60})]$$

$$(6) \quad SR_{80} = [NR_{80}]\,[(T_{70-80}) + (SR_{70}/NR_{70})]$$

The projected State labor force rates obtained in step 2 were first approximations. Rates that were above or below the acceptable limits were arbitrarily adjusted to the nearest limit.[9] We decided that the highest and the lowest rates observed among the States in the three censuses would provide broad limits for adjusting extreme projected State labor force participation rates.

In step 3, the number in the labor force in 1970 and 1980, in each age-sex-color group in each State, was obtained by multiplying the independently projected resident population by the projected rates of labor force participation of the corresponding age-sex-color group.

Finally, the projected State labor force levels for each age-sex-color group were summed. These totals then were divided into corresponding age-sex-color totals of the independently projected national totals. The resulting ratios were used as factors to adjust each State age-sex-color cell of every State to a national control total. The magnitude of this adjustment amounted to less than 0.5 percent in most cases.

These adjusted labor force figures were used to compute a new set of labor force participation rates which were accepted without further adjustment.

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[8] Both the State and national rates relate to the total resident labor force divided by the total resident population, times 100. In all three censuses, age detail was not published for the nonwhite labor force in States with fewer than 25,000 nonwhites. In these cases, the rates for a neighboring State were substituted.

[9] These limits were developed by obtaining the average of the 4 highest and the 4 lowest State rates, by age, sex, and color, for 1940, 1950, and 1960, and calculating the ratios of the average of the "high four" and "low four" to the corresponding national rates in 1940, 1950, and 1960. Where a trend in the ratio was noted, it was extrapolated in projecting the ratio to 1970 and 1980. Where no trend was apparent, the ratios were held constant at the average of 1940, 1950, and 1960: Multiplying the projected national labor force participation rates by the corresponding ratios provided upper and lower limits which were employed as criteria.